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MYCOTAXON

AN INTERNATIONAL JOURNAL DESIGNED TO EXPEDITE PUBLICATION OF RESEARCH ON TAXONOMY & NOMENCLATURE OF FUNGI & LICHENS

Volume XXIII July-September 1985

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CO-EDITORS

G. L. HENNEBERT
French Language Editor & Book Review Editor

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Université de Louvain, B-1348 Louvain-la-Neuve, Belgium

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English Language Editor & Managing Editor

Plant Pathology Herbarium, Cornell University
Ithaca, New York 14853, USA

SUSAN C. GRUFF
Assistant Editor & Index Editor

Plant Pathology Herbarium, Cornell University
Ithaca, New York 14853, USA

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A BIBLIOGRAPHIC ACCOUNT OF EXSICCATAE CONTAINING FUNGI

Donald H. Pfister
Harvard University Herbaria
Cambridge, Massachusetts

A number of words from the Latin *exsiccare* have been used to refer to sets of dried botanical specimens. *Exsiccata, exsiccatum, exsiccatae,* and *exsiccati* have all been used to refer generally to dried specimens. Here, the terms are used in a specific sense to denote uniform sets of numbered specimens. The proper form of these words when used in such a sense could be debated. For the sake of consistency, I am using *exsiccata* as a singular noun referring to a single title. By definition, an *exsiccata* is composed of multiple sets of duplicate specimens. Two or more titles will be referred to as *exsiccatae*. Sets containing fungi are called *exsiccati*, the form of the word in grammatical agreement with the word *fungi*. For the most part, I have chosen to use the "-ae" ending for all sets regardless of content when referred alone.

My purpose has been to bring together the titles of exsiccatae in which fungi were included. Authors, dates of publication, and comments on contents are given along with critical references. The included sets meet certain bibliographic criteria and can be defined as published, uniform, numbered sets of preserved specimens distributed with printed labels. The qualifications in this definition are briefly discussed below. Sets which fail to meet these criteria are treated in a separate section.

Publication - Only one article of the International Code of Botanical Nomenclature specifically deals with exsiccatae. That is Article 31 which states, "The distribution on or after 1 January 1953 of printed matter accompanying exsiccata [sic] does not constitute effective publication." This has been part of the Code since 1952. Under this provision, exsiccatae without published schedae, i.e., commentary or label information, are eliminated as bibliographic entities. Sets issued after 1 January 1953 have been given less critical attention in this list and, in any case, there are fewer titles which have been issued since that date.

A tangential clause of the International Code of

Botanical Nomenclature dealing with publication is Article 29 which states, "Publication by indelible autograph before 1 January 1953 is effective." Several exsiccatae have labels printed by such mechanical or graphic methods, including sets such as Roumeguere's *Fungi Selecti Gallici Exsiccati* and early numbers of several sets issued by Sydow.

Clearly, in some cases the number of duplicate sets was quite limited. Arguments as to whether these exsiccatae were effectively published could be made. I have rarely had enough information to make a judgement on this account.

Uniformity - The value of exsiccatae as reference specimens depends upon each distributed numbered specimen being part of the same collection--a duplicate in the strict curatorial sense. This principle has not always been adhered to. Either unintentionally or intentionally, mixed collections or substitute collections have been issued in some sets--most notably in Rabenhorst's *Fungi Europaei*. In some cases as well, the same number has been used on different labels; thus, two difficult taxa can be found under the same number. There is certainly no easy way to detect cases of substitution where, as is the case in some sets, no exact collection data are given. In this list, known non-uniform sets have been indicated but no attempt has been made to check, in detail, the uniformity of each set.

Numbering - Most exsiccatae are numbered consecutively in arabic numerals from beginning to end. The numbers are set numbers rather than collection numbers and may be used to cite specimens or descriptions with the accuracy of a page number. In some sets, each unit (fascicle, decade, century, etc.) is separately numbered.

Distribution - There is no consensus as to whether there must be a certain number of sets for an exsiccata to be considered effectively published. For the purposes of this text, it has been considered that there must be at least one known intact set, or that the contents of the series must in some way be traceable and verifiable. When sets have been recognized as unique, they have been excluded from the primary list. Certain titles which have by custom been treated as exsiccatae, because lists have been published, have been retained even if they seem to exist as unique sets.

Labels - No sets were included in which labels were completely handwritten; in some cases, labels were printed with title and collector, but other information was added by hand. These have mostly been accepted.

* * *

Stafleu (Taxon 21: 351-354) provides a general historical account of *exsiccatae*. Three periods of exsiccatae production can be noted--a classical period, a transitional period, and a modern period. The classical period covers the early sets usually produced in book or booklet form. Examples containing fungi of this period are Libert's *Plantae Cryptogamicae, Quas in Ardvenna Collegit*; *Deutschlands Schwämme in Getrockneten Exemplaren*; and *Scleromyceti Sueciae*. The last sets of this period were published around 1860; Fuckel's *Fungi Rhenani* is an example. Ravenel's *Fungi Carolinianae* is America's contribution to the period. In these sets new species were often described either in prefatory remarks or on labels. Specimens were often glued to sheets rather than packeted.

The transitional period--from perhaps 1860 in Europe to 1953--ended with article 31 of the Code of International Botanical Nomenclature which disallowed the publication of new species in exsiccatae. Exsiccatae of this period were rarely book-like in their construction, being either loose sets in folders or, if bound, without title pages and prefatory material. New species descriptions were sometimes included on labels, but were often published elsewhere. In the classical period and the transitional period, exsiccatae functioned both bibliographically and as reference or voucher sets. Rehm's *Ascomyceten*, Sydow's various exsiccatae, and many others are examples of the transitional period. It is material from this period which most often is consulted in taxonomic studies.

In the modern period--after 1953--exsiccatae have served only the reference or voucher function. The greatest number of sets were produced during the transitional period. There are few sets now in progress which contain fungi.

* * *

In my work I have checked several journals for reviews or notices. Most notable of these were *Hedwigia vols. 1-82*, 1852-1944, *Annales Mycologici vols. 1-42*, 1903-1944; *Herbarium vols. 1-2*, 1908-1932; and *Grevillea vols. 1-22*, 1872-1894. Both Stevenson's and Sayre's books have been freely cited. Unlike these authors, I have chosen to list sets by titles and have added both cross references and an author index.

My list is incomplete on several counts. Those looking for detailed listings of contents will be disappointed. Though I have listed contents for some sets, particularly those which are rare or in which many new taxa were described, contents of some important sets have not been listed. I do draw attention to the comprehensive card file index to the Farlow Herbarium holdings of fungus exsiccati. Where the information was already known, I have also indicated when new species actually were published in particular sets. Those who are looking among these titles for a solution to their favorite mystery label may also be disappointed. I have used many sources in an effort to complete the listings, but some titles have undoubtedly been overlooked. I have tried to include what I believed to be important sets and have excluded those which seem principally of popular interest and those used primarily as demonstration sets.

Indirectly, this list will serve as a reference to the location of exsiccatae in several of the herbaria where exsiccatae are kept as bibliographically distinct units --the Herbarium of the Institute of Systematic Botany, University of Uppsala; Farlow Herbarium, Harvard University; the National Fungus Collection, Beltsville, Maryland; and the Cornell University Plant Pathology Herbarium. Though I list the British Museum sets from published lists, I realize and point out to the reader that these materials containing fungi are now at the Royal Botanic Garden, Kew.

I wish to particularly thank Geraldine Kaye, librarian at the Farlow Library, for her help in the project from beginning to end. It was she who read and made notes from the complete run of *Hedwigia*. Geneva Sayre was always willing to help me learn the intricacies of the job. When I could not solve a problem, she often did. Daniel Plas, Chris Randall, and Regina Smith helped record information of Farlow Herbarium holdings. Others helped in various ways, either when I visited herbaria or in correspondence. Lennart Holm and Roland Moberg were of great help when I visited Uppsala. Henry Dissing and Henning Knudsen likewise were responsible for my success in Copenhagen. Paul Lentz, David Farr, and Amy Rossman at the National Fungus Collection in Beltsville aided me in various ways. Pat Fazio and Susan Gruff provided lists of holdings from the Cornell Plant Pathology Herbarium. Tuevo Ahti spent a great deal of time recording information on Finnish exsiccatae and holdings in Helsinki. I wish to thank them all. Elizabeth Smith and Carolyn Hesterberg typed the manuscript in its various forms. Their cheerful endurance is much appreciated.

This work was supported in part by a grant from the Harvard Graduate Society and by NSF grant BSR-8302192.

A note on sources used

BM List	History of the Collections Contained in the Natural History Department of the British Museum. 2 volumes. London 1904-1912. Pages 129-193 were the primary sources used.
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Lindau and Sydow	Lindau, G. and P. Sydow. Thesaurus Litteraturae Mycologicae et Lichenologicae.Lipsiis. 1907-1915. When citing this work, entry numbers are listed.
Sayre	Sayre, Geneva. Cryptogamae Exsiccatae--An Annotated Bibliography of Published Exsiccatae of Algae, Lichenes, Hepaticae, and Musci. Mem. New York Bot. Gard. 19: 1-423. 1969-1975.
TL-2	Stafleu, F. A. and R. S. Cowan. Taxonomic Literature. Second Edition-vol. 1: A-G. Utrecht. 1976, vol. 2: H-Le. Utrecht. 1979, vol. 3: Lh-O. Utrecht. 1981, vol. 4: P-Sak. Utrecht. 1983. Volume and page numbers are listed or, if assigned an entry number, this is listed.
Stevenson	Stevenson, J. A. An Account of Fungus Exsiccati Containing Material from the Americas. Beih. Nova Hedwigia 36: 1-563. 1971.
Bot. Kal.	Sydow, P. Deutscher Botaniker Kalendar. 1899. Berlin.
Bot. Zeit. to 1889	Botanische Zeitung welche Recensionen, abhandlungen, Aufsaetze, Neuigkeiten und Nachrichten, die Botanik betreffend, enthaelt. Regensburg.

ASCOMYCETEN. Fasc. 1-57. Numbers 1-2175. 1870-1918. Regensburg (fasc. 1-26), Neufriedenheim (fasc. 27-55), Leipzig (fasc. 56-57).

Rehm, Heinrich (1828-1916)

DATES OF PUBLICATION: Stevenson p. 316-337.

Fasc.	Numbers	Date	
1	1-50	1870	
2	51-100	1871	
3	101-150	1872	
4	151-200	1873	
5	201-250	1874	
6	251-300	1875	
7	301-350	1876	
8	351-400	1876	
9	401-450	1878	
10	451-500	1878	
11	501-550	1879	Bot. Zeitung 38(10): 175. 1880.
12	551-600	1880	Bot. Centralb. 2(42): 90. 1881.
13	601-650	1881	
14	651-700	1882	
15	701-750	1883	
16	751-800	1884	
17	801-850	1885	
18	851-900	1886	
19	901-950	1888	
20	951-1000	1889	
21	1001-1050	1891	
22	1051-1100	1892	
23	1101-1150	1895	
24	1151-1200	1896	
25	1201-1250	1898	Bot. Centralb. 75(3): 71. 1898. 6 Jul.
26	1251-1300	1899	*Bot. Centralb. 79(9/10): 319-320. 1899. 29 Aug .
27	1301-1350	1900	*Bot. Centralb. 84(8): 254-255. 1900. 14 Nov .
28	1351-1400	1901	
29	1401-1450	1902	
30	1451-1500	1902	
31	1501-1525	1903	
32	1526-1550	1904	
33	1551-1575	1904	
34	1576-1600	1905	
35	1601-1625	1905	
36	1626-1650	1905	
37	1651-1675	1906	
38	1676-1700	1907	
39	1701-1725	1907	
40	1726-1750	1907	
41	1751-1775	1908	
42	1775-1880	1908	
43	1801-1825	1909	
44	1826-1850	1909	
45	1851-1875	1909	
46	1876-1900	1910	
47	1901-1925	1910	
48	1926-1950	1911	

*some specimens listed

Fasc.	Numbers	Date
49	1951-1975	1911
50	1976-2000	1912
51	2001-2025	1912
52	2026-2050	1913
53	2051-2075	1913
54	2076-2100	1914
55	2101-2125	1914
56 57	2126-2175	1918

Notes: Stevenson listed fascicle 7 as questionably published in 1876. This date is confirmed by the review in Grevillea 5: 37 (Sept. 1876).

New species were described in Hedwigia and in Ann. Mycol. Descriptions are listed by Stevenson. There are a number of nomen nuda for which descriptions were never printed.

The last two fascicles were prepared by F. W. Neger and were published by T. O. Weigel. The new species of the first 12 fascicles were listed in Bot. Centralb. 3(11): 404-405. 1882.

References: Bot. Kal. 1899. p. 120; Lindau and Sydow 21923, 21928, 38297; Stevenson pp. 316-337; TL2/4: 652. 1983.

2 FH (1 dist.), BPI, CUP (dist. in Durand and Fairman Herbaria), UPS (1-550, 1001-2175), S, C (dist.), BM (list), PC (dist.), HBG (partial).

ASCOMYCETES AND LOWER FUNGI. Fasc. 1-4. Numbers 1-100. ?May 1907-?Nov. 1909. New York.

Wilson, Guy West (1877-) and Seaver, Fred Jay (1877-1970)

DATES OF PUBLICATION: From Stevenson pp. 511-513.

Fasc.	Numbers	Date
1	1-25	1907
2	26-50	1909
3	51-75	1909
4	76-100	1909

FH, BPI, CUP, S, NY, HBG.

BERMUDA FUNGI. Cent. 1-2. Numbers 1-200. Nov. 1943-1945. Ithaca, New York.

Whetzel, Herbert Hice (1877-1944), and Waterston, John MacLaren (1911-)

DATES OF PUBLICATION: From Stevenson pp. 508-513 and FH records.

Cent.	Numbers	Date	
1	1-100	Nov 1943	Received FH 1936
2	101-200	1945	Indexed FH Nov 1945.

Notes: Century 1 was published by Whetzel. Century 2, completed after Whetzel's death, was published as Whetzel and Waterston. Packets have labels with printed titles. The first fascicle had all else handwritten; the second century had typewritten information. I have no explanation for the discrepancies in the dates listed above for the issuance of Century 1.

FH, BPI, CUP, NY

BRITISH FUNGI: CONSISTING OF DRIED SPECIMENS OF THE SPECIES, DESCRIBED IN VOL. V., PART II OF THE ENGLISH FLORA: TOGETHER WITH SUCH AS MAY HEREAFTER BE DISCOVERED INDIGENOUS TO BRITAIN. Fasc. 1-4. Numbers 1-350. 1836-1843. London.

Berkeley, Miles Joseph (1803-1889)

DATES OF PUBLICATION: From title page.

Fasc.	Numbers	Date
1	1-60	1836
2	61-120	1836
3	121-240	1837
4	241-350	1843

Notes: Specimens were issued as supplements and additions to The English Flora ed. 2, volume V, part II. In the supplement to that volume, M. J. Berkeley stated his intention to assemble a set of specimens. J. D. Hooker footnotes this as follows: "In the determination of the various species of Fungi, it is very certain that nothing renders such valuable aid to the student as the being able to refer to authentic specimens."

Specimens were glued to sheets accompanied by numbered labels bearing the fungus name. Descriptions of new species and comments on previously described species were printed separately. Most of those species noted as new species were previously described. Stafleu and Cowan note sets at BM, E, K, PC.

References: TL-2/1: 192; Lindau and Sydow no. 2318, Bot. Kal. 1899. p. 118.

FH, BPI, UPS.

BRITISH FUNGI, MYCOLOGIA BRITANNICA. Fasc. 1 & 2. 100 Spec. 2 Fasc.

Ayres, Philip Burnard (1813-1863)

Note: This set is known only by title.

References: BM (list), B&B, Herbarium 1: 161.

CALIFORNIA FUNGI. Series 1- Numbers 1-1425. 1931-84 in progress. Berkeley, California.

Parks, Harold E. (1880-1968); Bonar, Lee (1891-1977); Miller, Vera Mentzer (1909-); McMillan, Phyllis Gardner ( ); Tavares, Isabelle Irene (1921-).

DATES OF PUBLICATION: From Stevenson p. 70-75.

Series	Number	Dates
1	1-300	1931
2	301-416	1935
3	417-600	1942
4	601-750	1948
5	751-850	1952
6	851-1000	1955
7	1001-1125	1957
8	1126-1225	1963
9	1226-1375	1970

FH, BPI, CUP, UPS (dist.), S.

CENTRAL AMERICAN FUNGI. Fasc. 1-3. Numbers 1-150 (plus extra specimens). 1896. Iowa City, Iowa.

Smith, Charles Leonard (1866-1923)

DATES OF PUBLICATION: From Stevenson p. 389-391.

Fasc.	Numbers	Date
1	1-50	1896
2	51-100	1896
3	101-150	1896

Notes: Some type material was included. Species were described in various publications by Smith, Ellis, MacBride, and Everhart.

FH, BPI

A CENTURY OF ILLUSTRATIVE FUNGI WITH GENERIC SYNOPSES OF THE BASIDIOMYCETES AND MYXOMYCETES. Century 1. Numbers 1-100. Sept. 1889. Syracuse, New York.

Underwood, Lucien Marcus (1853-1907) and Cook, Orator Fuller (1867-1949).

DATES OF PUBLICATION: The single century was issued in September, 1889, according to Stevenson p. 479-480. Bot. Centralb. 41(3/4): 86. 1890. (22 Jan); Bot. Kal. 1899. p. 120.

References: Lindau and Sydow number 27542.

FH, BPI, NY

LES CHAMPIGNONS FIGURÉS ET DESSÉCHSÉS. Vol. 1-2. Numbers 1-100. 1882-1888. Paris.

Doassans, Jacques Émile (1852-1908) and Patouillard, Narcisse Theophile (1854-1926)

DATES OF PUBLICATION: From title page.

Vol.	Numbers		
1	1-50	?1882	Bot. Zeitung 38(49):831. 1880 (3 Dec.)
2	51-100	1888	

Notes: The set consists of four volumes; two of specimens and two of illustrations. Only possession of specimens is indicated below. New species are described. The volumes were published by Frederick Henry, Libraire-Éditeur. Published in octavo, gray, hardbound books with metal latches.

References: Pfister, D. H. Contributions of Reed Herbarium 25: i-v, 1-211. 1977. TL-2/4: 94.

FH (1-50), CUP, UPS (1-50).

A COLLECTION OF DRIED PLANTS, NAMED ON THE AUTHORITY OF THE LINNAEAN HERBARIUM AND OTHER ORIGINAL COLLECTIONS. Fasc. 1-4. Numbers 1-100. 1789-1791. London.

Dickson, James (1738-1822)

DATES OF PUBLICATION: From Sayre p. 14.

Fasc.	Numbers	Date
1	1-25	1789
2	26-50	1790
3	51-75	1791
4	76-100	1791

Notes: Number 100 is *Lycoperdon pedunculatum*; this is the only fungus included in the set according to Sayre's published lists. I have not seen a copy of this work.

References: Sayre p. 14, TL-2/1: 644, Lindau and Sydow 7063, Bot. Kal. 1899. p. 116.

CRYPTOGAMAE CECHOSLOVENICAE EXSICCATAE, EDITAE ALS INSTITUTO BOTANICO POLYTHECHNICI PRAGENSIS, CURANTIBUS PROF. K. KAVINA ET DOC. DR. A. HILITZER, Fasc. 1-6. Numbers 1-300. 1933-1937. Prague.

Kavina, Karel (1890-1948) and Hilitzer, Alfred (1899-1940)

DATES OF PUBLICATION: From Sayre p. 30, and schedae.

Fasc.	Decade	Number	Schedae	Sayre
1,2	1-2	1-20		30 Dec 1933
	3-4	51-70		
3,4	5-8	101-140	15 Apr 1935	31 Jul 1935
5,6	9-14	201-260	15 Feb 1937	26 Mai 1937

Notes: The above numbers refer only to the decades containing fungi, other groups were covered by Sayre. Schedae were published in Acta Musei Moraviensis Brno. No new species were found.

The following assisted in the preparation of one or more of the fascicles: O. Klement, V. Kuták, Dr. A. Pilát, J. Anders, Dr. A. Bayer, J. Dyr, Dr. J. Klika, S. Krejci, Z. Pilous, Dr. E. Bandyš, Dr. Z. Černohorský, K. Kára, V. Los, Dr. J. Suza, R. Vanek.

FH, [BPI (no. 1-140 partial).

CRYPTOGAMAE FORMATIONUM COLORADENSIUM. Cent. 1-6. Numbers 1-615. 1906-1908. Lincoln, Nebraska (Cent. 1-4), Minneapolis, Minnesota (Cent. 5-6).

Clements, Frederick Edward (1874-1945) and Clements, Edith Gertrude Schwartz (1877-1971)

DATES OF PUBLICATION: Sayre p. 10

Centuries	Number	Date
1-2	1-200	Feb 1906
3-4	201-400	Apr 1907
5-6	401-615	Jun 1908

Notes: New species were noted in the set; however, descriptions were not included. Many of the taxa remain nomen nuda. Remnants of Clements' fungus herbarium at BPI contain portions of the material examined.

References: Sayre p. 10, Stevenson p. 88-90, TL-2/1: 510.

2 FH, BPI, PC (dist.)

CRYPTOGAMAE PARASITICAE IN INSULA JAVA LECTE EXSICCATAE. Fasc. 1-3. Numbers 1-150. 1899-1900. Batavia, Java.

Raciborski, Maryjan (1863-1917)

DATES OF PUBLICATION: Sayre p. 42

Fasc.	Numbers	Date	
1	1-50	1899	Bot. Centralb. 82(5): 134. 1900. 25 Apr.
2	51-100	1899	Bot. Centralb. 87(4): 153. 1901. 17 Jul.
3	101-150	1900	

References: Raciborski, Parasitische Algen und Pilze Javas, 3 parts, Batavia, 1900; Lindau and Sydow 21638, 21639. Printed schedae were issued with specimens. Many of Raciborski's species were included. All were apparently published elsewhere.

FH (fasc. 1 and 2 only), PC (?dist.), HBG.

CRYPTOGAMEN-HERBARIUM. Series I. Fasc. V. Numbers 1-10. 1854. Bielefeld.

Wagner, Hermann (1824-1879), Wagner, Albert ( )

DATES OF PUBLICATION: Sayre p. 53

Notes: Under this title a Series I and Series II were published. Only Fascicle V of Series I contains fungi. These are listed in full below.

Lief V: *Uredo appendiculata* Pers., 2. *Uredo caprearum* DeCand. 3. *Uredo Roborum* DeCand. 4. *Aecidium tussilaginis* Pers., 5. *Aecidium euphorbiae* Pers., 6. *Aecidium elongatum* (var. *Rhamni*) Rabenh., 7. *Aecidium cornutum* var. *Sorbi* Rab., 8. *Sphaeria aegopodii* Rabenh., 9. *Sphaeria Robertiani* Rabenh., 10. *Erysibe guttata* Fries.

References: Lindau and Sydow 21859 (28160). Führer ins Reich der Cryptogamen (Erläuterungen der Sammlung). Flecten 1854, Pilze 1854, 3. Aufl. 1857; Cryptogamen-Herbarium. Fortgesetzt von Albert Wagner. 3. Aufl. Bielefeld 1880.

FH, BPI, S, BM (list)

CRYPTOGAMES DE L'EMPIRE COLONIAL FRANÇAIS. CHAMPIGNONS. Series A, numbers 1-20. Series B, numbers 1-20. Series C, numbers 1-20. 1938-1957. Paris.

Heim, Roger (1900-1979)

DATES OF PUBLICATION: From title page.

Series	Number	Date
A	1-20	1 Sep 1938
B	1-20	May 1950
C	1-20	Oct 1957

Notes: Series C was apparently misdated on the title page since it was indexed at FH April 1, 1956. Most determinations are by Heim but a Patouillard identification was found in Series A. Isotypes of species described by Heim were distributed in Series B. The title was changed in Series C to "Cryptogames des Territories Français D'Outre-Mer." A large number of undistributed sets remain at PC.

References: See Heim, Rev. Gén. Bot. 46: 63. 1934.

FH, BPI, CUP, UPS (dist.), NY (ser. B, C), PC

CRYPTOGAMES RECUEILLIES DANS LA PROVENCE DE NAMUR PAR A. BELLYNCK, DE LA COMPAGNIE DE JÉSUS. Centuries I-II. Numbers 1-200. 1852. Namur.

Bellynck, A[ugust-Alexis-Adolphe-Alexander] (1814-1877)

Note: Fungi were included in the Bellynck Catalogue listed below. I have not seen this set but since the fungi follow the lichens, their numbers are probably those above 90.

References: Bellynck. Catalogue des Cryptogames observées dans les environs de Namur. Bull. Acad. Sci. Bruxelles 19: 45-81. 1852. TL-2/1: 170; Bot. Kal. 1899. p. 116.

CRYPTOGAMISCHE GEWACHSE DES FICHTELGEBIRG'S. Fasc. 1-5. Numbers 1-125. 1801-1805. Hof & Leipzig. Edition II. Fasc. 1-42. 1-865. 1806-1838. Leipzig.

Funck, Heinrich Christian (1771-1839)

DATES OF PUBLICATION: Stafleu and Cowan give a detailed account in Taxonomic Literature 2 (1:899).

Notes: More than one edition was published under this title. In the FH copy, fungi were included in fascicle 5 and following fascicles. Of the fungi, there are a few Ascomycetes, Deuteromycetes and Uredinales. Dates listed with the entries below are from Sayre pp. 25-26 and from *Taxonomic Literature*. Each Heft is accompanied by printed description in Latin. These precede the specimens. FH copies in original green wrappers. The fungi which follow are recorded from the FH copy.

References: Lindau and Sydow no. 9429. Sayre p. 25, Bot. Kal. 1899, p. 117.

FH, BPI, BM (list)

Heft 5. Zweyte Ausgabe. 1806 (20 Apr)

120. *Sphaeria fimbriata* α *Carpini* Pers.; 121. *Hysterium conigenum* Pers.; 122. *Xyloma acerinum* Pers.; 123. *Sclerotium suffultum* Rebent.; 124. *Aecidium cornutum* Pers.; 125. *Aecidium tussilaginis* Pers.

Heft 6. 1806 (20 Apr)

142. *Sphaeria disciformis* Hoffm.; 143. *Xyloma pezizoides* Pers. [cancelled]; 144. *Erineum tiliaceum* Pers.; 145. *Erineum asclepiadeum* Willden.

Heft 7. 1806 (before 20 Mar 1807)

163. *Aecidium Euphorbiae* Pers.; 164. *Uredo alchemillae* Pers.; 165. *Erineum populinum* Pers.

Heft 8. 1807 (before 20 Mar)

183. *Sphaeria Anethi* Pers.; 184. *Xyloma salicinum* Pers.; 185. *Xyloma alneum* Pers.

Heft 9. 1807 (12 Apr 1808)

199. *Aecidium Galii* Pers.; 200. *Aecidium Rum.* [sic] β. *Grossulariae* P.; 201. *Aecidium crassum* Pers.; 202. *Aecidium crass.* [sic] β. *Ficariae* P.; 203. *Aecidium Violae* A. et Schw.; 204. *Erineum acerinum* Pers.; 205. *Erineum alneum* Pers.

Heft 10. 1808 (12 Apr)

220. *Aecidium cancellatum* β. *Ariae*; 221. *Aecidium Tragopogi* Pers.; 222. *Uredo farinosa* β. *Senecionis*; 223. *Puccinia anemones* Pers.; 224. *Erineum fagineum* Pers.; 225. *Erineum betulinum* Rebent.

Heft 11. 1808 (12 Apr)

244. *Shaeria* [sic] *fimbriata* β. *Coryli* P.; 245. *Uredo Rosae centifoliae* P.

Heft 12. 1808 (16 Apr 1809)

263. *Xyloma rubrum* Pers.; 264. *Aecidium Prenantis* P.; 265. *Uredo Euphrasiae* Schum.

Heft 13. 1808 (16 Apr 1809)

281. *Sphaeria nivea* Pers.; 282. *Sphaeria herbarum* Pers.; 283. *Puccinia Anemones* β. *Phyteumatis*; 284. *Tremella Auricula Indae* Pers.; 285. *Erineum Vitis* [without author].

Heft 14. 1809 (16 Apr)

302. *Aecidium Orobi tuberosi* P.; *Aecidium Anemones* P.; 304. *Uredo Ficariae* A. & S. [no specimen FH]. 305. *Geoglossum hirsutum* P.

Heft 15. 1809 (20 Jul, according to Sayre; 6 May 1810 according to Stafleu and Cowan)

321. *Sphaeria tubaeformis* Tod.; 322. *Xyloma rubrum* β *Badi*; 323. *Sclerotium populinum* Pers.; 324. *Aecidium crass.* [sic] γ *Aquilegiae*; 325. *Uredo anemones* Pers.

Heft 16. 1810 (6 Mai)

344. *Sphaeria maculiformis* Pers.; 345. *Peziza radicata* Reich. [no specimen FH].

Heft 17. 1810 (Jul-Dec)

363. *Sphaeria fusca* Pers.; 364. *Aecidium pini* Pers.; 365. *Racodium cellare* Pers.

Heft 18. 1811 (Mai-Jun)

379. *Sphaeria Lingam* Tod.; 380. *Sphaeria Dematium* Pers.; 381. *Xyloma Andromedae* Pers.; 382. *Xyloma betulinum* F.; 383. *Xyloma fagineum* Pers.; 384. *Sclerotium Erysiphe* Pers.; 385. *Aecidium Berberidis* Pers.

Heft 19. 1812 (24 Apr 1814)

402. *Sphaeria nebulosa* Pers.; 403. *Hysterium scirpinum* F.; 404. *Peziza abietis* P.; 405. *Racodium rupestre* P.

Heft 20. 1814 (9 Apr 1815)

421. *Sphaeria Trifolii* Pers.; 422. *Xyloma salicinum* Pers.; 423. *Xyloma salignum* Pers. [corrected in handwriting to *Sclerotium salianum* Pers.]; 424. *Aecidium asperifolii* Pers.; 425. *Aecidium Phaseoli* F.

Heft 21. 1815 (28 Apr 1816, according to Sayre; before 1 Nov 1815, according to Stafleu and Cowan)

445. *Uredo gyrosa* Rebent.

Heft 22. 1815 (28 Apr 1816)

461. *Xyloma lichenoides* DeCand.; 462. *Puccinia mucronata* α *Rosae* Pers.; 463. *Peziza pulchella* Pers.; 464. *Monilia Piceae* F.; 465. *Erineum pyrinum* P.

Heft 23. 1816 (20 Apr 1817)

482. *Sphaeria pusilla* Pers.; 483. *Uredo linearis* α *frumenti* P.; 484. *Uredo tremellosa* Str.; 485. *Puccinia cercaeae* Pers.

Heft 24. 1817 (20 Mar 1818)

499. *Sphaeria decorticata* Pers.; 500. *Hysterium pulicare* Pers.; 501. *Hypoderma pinastri* DeCand.; 502. *Aecidium Clematitis* DeCand.; 503. *Uredo Euphorbiae Heliosc.* [sic] Pers.; 504. *Erineum aureum* Pers.; 505. *Erineum Iicinum* DeCand.

Heft 25. 1818 (7 Mai)

521. *Sphaeria Sambuci* Pers.; 522. *Tubercularia vulgaris* Pers.; 523. *Aecidium carneum* Nees; 524. *Aecidium Erythronii* DeC.; 525. *Uredo Tussilaginis* Pers.

Heft 26. 1819 (30 Apr)

543. *Hysterium Hederae* Nees; 544. *Roestelia cancellata* Rebent.; 545. *Aecidium Urticae* DeC.

Heft 27. 1819 (16 Apr 1820)

564. *Uredo pteridiformis* F.; 565. *Puccinia conflomerata* Schm. et Kunz.

Heft 28. 1822 (29 Sep, according to Sayre; Feb-Mai, according to Stafleu and Cowan)

582. *Sphaeria dryina* Pers.; 583. *Sphaeria Gnomon* Pers.; 584. *Xyloma salicinum* Pers.; 585. *Xyloma Ilicis* Fries.

Heft 29. 1823 (Mar according to Sayre; Jan-Jun, according to Stafleu and Cowan)

604. *Sphaeria punctiformis* β *Hederae* P.; 605. *Erineum roseum* Schulz.

Heft 30. 1824 (Aug according to Sayre; Jan-Jul, according to Stafleu and Cowan)

625. *Septaria Ulmi* K. et Schm.

Heft 31. 1825 (Sep, according to Sayre; Jan-Jul, according to Stafleu and Cowan)

644. *Sphaeria fuliginosa* Pers.; 645. *Phyllerium sorbeum* Fries.

Heft 32. 1826 [no fungi]

Heft 33. 1827 (Sep, according to Sayre; Jul-Aug, according to Stafleu and Cowan)

685. *Cacoma pedicularitum* Link.

Heft 34. 1828 (Jan-Jun, according to Sayre; Jul-Dec, according to Stafleu and Cowan)

704. *Sclerotium Semen* Tod.; 705. *Puccinia Bistortae* Dec.

Heft 35. 1829 (Dec 1829-Jan 1830, according to Sayre; before 21 Dec 1829, according to Stafleu and Cowan)

724. *Dothidea typhina* Fries; 725. *Leptostroma vulgare* Fries.

Heft 36. 1831 (Jan-Jun, according to Sayre; Jan-Apr, according to Stafleu and Cowan)

740. *Uredo Cytisi nigr.* [sic] de Strauss.; 741. *Puccinia Ribis* De Cand.,
742. *Puccinia Polygoni amph.* [sic] P.; 743. *Sphaeria coccinea* P.;
744. *Dodithea Ulmi* Fr.; *Dodithea stellaris* Fr.

Heft 37. 1832 (Jan 1833)

760. *Sphaeria ophioglossoides* Pers.; 761.*Sphaeria Vaccinii* Sowerb.;
762. *Erysibe divaricata* Link; 763. *Erysibe obtusata* Link; 764. *Puccinia compositarum* Link; 765. *Tremella urticae* Pers.

Heft 38. 1835 (Dec, according to Sayre; Feb-Jun, according to Stafleu and Cowan)

784. *Puccinia Prunorum* Link; 785. *Puccinia graminis* P.

Heft 39. 1836 (Mai, according to Sayre; Apr, according to Stafleu and Cowan)

803. *Caeoma aroideum* Rudolph; 804. *Dothidea asteroma* v. *Rosae;*
805. *Dothidea asteroma* v. *Violae* Fr.

Heft 40. 1837 (Mar)

823. *Erineum Juglandis* Sehl.; 824. *Phragmidium incrassatum* Link;
825. *Leotia Bulliardi* Pers.

Heft 41. 1838 (Jan 1839, according to Sayre; Spring 1838, according to Stafleu and Cowan)

842. *Sphaeria cruenta* Fries; 843. *Caeoma appendiculosum* Lk.;
844. *Phacidium coronatum* Fr.; 845. *Erineum Padi* Duval.

Heft 42. 1838 (Jan 1839, according to Sayre; spring 1838, according to Stafleu and Cowan)

863. *Aecidium allii ursini* Pers.; 864. *Sphaeria Doliolum* Pers.; 865. *Cladosporium herbarum* Link.

CRYPTOGAMS DISTRIBUTED BY THE FARLOW HERBARIUM OF HARVARD UNIVERSITY. RELIQUIAE FARLOWIANAE. Cent. 1-10. Numbers 1-1000. Feb. 25, 1922-Mar. 15, 1946. Cambridge, MA.

Thaxter, Roland (1858-1932), and Linder, David Hunt (1899-1946).

Dates of Publication: Stevenson p. 438-439. Sayre p. 11.

Cent.	Numbers	Date
1	1-100, 9 extra	Feb 25, 1922
2	101-200, 18 extra	Feb 25, 1922
3	201-300, 41 extra	Feb 25, 1922
4	301-400, 8 extra	Feb 25, 1922
5	401-500, 5 extra	Feb 25, 1922
6	501-600	Feb 25, 1922
7	601-700	Sep 24, 1934
8	701-800	Feb 1, 1937
9	801-900, 11 extra	Mai 1, 1939
10	901-1000	Mar 15, 1946

Notes: Centuries 1-6 were supervised by Roland Thaxter. 7-10 were edited by D. H. Linder.

FH, BPI, CUP, UPS (dist.)

CRYPTOTHECA LUSITANA. Numbers 1-123. 1842-1850.

Welwitsch, Friedrich Martin Josef (1806-1872).

Notes: Berkeley (1853) notes in a paper entitled, "Source Notes upon the Cryptogamic portion of the Plants Collected in Portugal 1842-1850" by Dr. Fried. Welwitsch, 74 numbers of fungi and identifies 66. The following new species were described: no. 12. *Dothidea durissima*, no. 20. *Gymno - sporium inquinous*, no. 37. *Phyllosticta ceratoniae*, no. 38. *Perisporium nitidulum*, no. 46. *Phoma Erythrinae*, no. 46. *Sphaeropsis crassipes* Mont. Mss., no. 47. *Valsa Welwitschii*, no. 51. *Depazea crepidophora* Mont. Mss., no. 64. *Septoria pisi*, no. 72. *Phoma cacti*.

References: Lindau and Sydow 28653, Sayre p. 55, Bot. Kal. 1899. p. 118. Berkeley, M. J. Some notes upon the cryptogamic portion of the plants collected in Portugal, 1842-1850 by Dr. Fried. Welwitsch--The fungi by Rev. M. J. Berkeley. London, William Pamplin. 12 p.

DECADES FUNGORUM BRASILIENSIUM. Decades 1-4, Numbers 1-300. Append. 1-15. 1910-1912.

Theissen, Ferdinand (1877-1919).

DATES OF PUBLICATION: See Stevenson p. 444-447.

Cent.	Numbers	Date	
1	1-100	1910	Received FH 8 Sep 1910
2	101-200	1910	
3	201-260	1911	Received FH 3 Oct 1911
4	261-300	1912	
	Appendix of 15 specimens		

Note: Labels are printed with handwritten names and localities.

References: Stevenson p. 444-447, Lindau and Sydow number 39907.

FH, BPI (dist.), S, HBG (partial).

DECADES MYCOLOGIAE ARGENTINAE

See Hongos Sud-Americanos

DECADES MYCOLOGICAE ITALICAE. Decades 1-12. Numbers 1-120. 1879. Conegliani.

Spegazzini, Carlos (1858-1926)

DATES OF PUBLICATION: from title pages.

Decades	Numbers	Dates t.p.	Reviews
1-3	1-30	1 Apr 1879	Bot. Zeitung 37(25): 404. 1879. (20 Jun).
4-6	31-60	1 Aug 1879	Grevillea 8(45): 40. 1879 (Sep); Bot. Zeitung 37(48): 774. 1879. (28 Nov).
7-12	61-120	1 Nov 1879	Grevillea 8(47): 120. 1880 (Mar); Bot. Zeitung 38(10): 175. 1880. (5 Mar).

Notes: Cooke reviewed the set in Grevillea 8: 36. 1879 as follows: "The original proposal of Sig. Spegazzini was to supply a limited number of small sets of dried specimens of Italian Fungi, as were new or rare, and which were not found in sufficient quantity for more pretentious exsiccati. For these select and valuable specimens a high price was demanded, but as the specimens were promised to be of a peculiar kind, few and good, this was a question of little moment. Six decades have now been issued, and we must confess them to be a lamentable satire upon the prospectus....It is a very unthankful office to remind persons of their promises, and to claim their fulfillment, but the vendors of scientific specimens are assumed to be gentlemen of education, superior to the advertising subterfuges of a petty tradesman, or the questionable morality of an ordinary draper's assistant."

New species were described, particularly in decades 7-12, by Spegazzini and Passerini. Latin descriptions were included. The price of decades 4-6 was 7.50 Francs; for decades 7-12 the price was 15 Francs.

Reference: Bot. Kal. 1899. p. 120.

FH, BPI, UPS, S, BM (list), HBG.

DEUTSCHLANDS SCHWÄMME IN GETROCKNETEN EXEMPLAREN. Fasc. 1-9, Numbers I-CCXXV. 1815-1819. Leipzig. (G. Voss).

Holl, C. Friedrich (-), Schmidt, Johann Carl (1793-1850), and Kunze, Gustav (1793-1851).

DATES OF PUBLICATION: See Pfister, Taxon 31: 498-502. 1982.

Fasc.	Numbers	Title page	Leipziger Lit. Zeitung
1	I-XXV	1815	Nov 1815
2	XXVI-L	1815	Jul 1816
3	LI-LXXV	1816	Jul 1816
4	LXXVI-C	1816	Jul 1816
5	CI-CXXV	1816	Jul 1816
6	CXXVI-CL	1817	22 Oct 1819
7	CLI-CLXXV	1817	22 Oct 1819
8	CLXXVI-CC	1818	Jun 1819 J. Gen. Lit. Etrangère 19:
9	CCI-CCXXV	1819	7 Oct 1820

Notes: In all 27 new species of Basidiomycetes, Ascomycetes, and Deuteromycetes were published.

Fascicles 1 and 2 were edited by Holl and Schmidt. The remaining fascicles were edited by Schmidt and Kunze. All fascicles were bound in paper wrappers. The specimens and labels were glued to the sheets. Each fascicle also contained six pages of printed descriptions of included fungi.

Kunze and Schmidt also published the Mykologische Hefte (1817 and 1823) composed of monographs, descriptions, and lists of fungi by Kunze and Schmidt. In several instances additional comments on species were issued in Deutschlands Schwämme.

References: Lindau and Sydow number 12478; Bot. Kal. 1899. p. 119.

2 FH (1 partial), BPI, UPS, BM (list), NY.

Lieferung 1. 1815.

I. *Sphaeria Padi* Nobis; II. *Sphaeria Pteridis* Rebent.; III. *Sphaeria disciformis* Pers.; IV. *Sphaeria typhina* Pers.; V. *Sphaeria nivea* Pers.; VI. *Sphaeria cupularis* Pers.; VII. *Sphaeria Berberidis* Pers.; VIII. *Sphaeria strobilina* Nobis; IX. *Xyloma alneum* Pers.; X. *Sclerotium durum* Pers.; XI. *Licea strobilina* Alb. et Schw.; XII. *Aecidium Convallariae* Schum.; XIII. *Aecidium Asperifolii* Pers. (β. *Urticae*); XIV. *Aecidium Berberidis* Pers.; XV. *Aecidium Orobi* Pers.; XVI. *Uredo Symphyti* Kunze; XVII. *Uredo Euphorbiae* Pers.; XVIII. *Uredo linearis* Pers. (β. *Polypodii*); XIX. *Puccinia mucronata* Pers. (α *Rosae*); XX. *Puccinia Circaeae* Pers.; XXI. *Erineum pyrinum* Pers.; XXII. *Erineum Padi* Rebent.; XXIII. *Erineum tiliaceum* Pers.; XXIV. *Erineum alneum* Pers.; XXV. *Racodium rupestre* Pers.

Lieferung 2. 1815.

XXVI. *Sphaeria ophioglossoides* Pers.; XXVII. *Sphaeria Hypoxylon* Pers.; XXVIII. *Sphaeria polymorpha* Pers.; XXIX. *Sphaeria atronitens* Nobis; XXX. *Sphaeria longissima* Pers.; XXXI. *Sphaeria fimbriata* Pers. (α. *Carpini*); XXXII. *Sphaeria Ulmi* Duval; XXXIII. *Sphaeria Doliolum* Pers.; XXXIV. *Sphaeria cinnabarina* Tode ; XXXV. *Stilbospora ovata* Pers.; XXXVI. *Hysterium Sorbi* Wahlenb.; XXXVII. *Xyloma salicinum* Pers.; XXXVIII. *Physarum cinereum* Pers.; XXXIX. *Onygena equina* Pers.; XL. *Uredo populina* Pers. (β *betulina*); XLI. *Uredo striola* Strauss; XLII. *Puccinia Dianthi* Lam. et DeCand.; XLIII.

Exosporium Tiliae Link ; XLIV. *Agaricus alneus* Pers.; XLV. *Hydnum Auriscalpium* Pers.; XLVI. *Thelephora purpurea* Pers.; XLVII. *Clavaria Ligula* Pers.; XLVIII. *Peziza granuliformis* Pers.; XLIX. *Erineum acerinum* Pers.; L. *Erineum fagineum* Pers.

Lieferung 3. 1816.

LI. *Sphaeria fusca* Pers.; LII. *Sphaeria ribesia* Pers.; LIII. *Sphaeria graminis* Pers.; LIV. *Sphaeria nebulosa* Pers.; LV. *Sphaeria cristata* Pers. (β. *arundinis*); LVI. *Sphaeria tubaeformis* Tode; LVII. *Sphaeria Gnomon* Tode; LVIII. *Sphaeria byssiseda* Pers.; LIX. *Sphaeria herbarum* Pers.; LX. *Sphaeria Tiliae* Pers.; LXI. *Sphaeria Aegopodii* Pers.; LXII. *Hysterium Fraxini* Pers.; LXIII. *Hysterium quercinum* Pers.; LXIV. *Aecidium Anemones* Pers.; LXV. *Aecidium Violae* Schum.; LXVI. *Uredo Alchemillae* Pers.; LXVII. *Uredo gyrosa* Rebent.; LXVIII. *Puccinia Anemones* Pers.; LXIX. *Clavaria herbarum* Pers.; LXX. *Tremella Urticae* Pers.; LXXI. *Peziza pulchella* Pers.; LXXII. *Peziza nidulus* Nobis; LXXIII. *Peziza ribesia* Pers.; LXXIV. *Helmisporium velutinum* Link; LXXV. *Monilia Piceae* Funk.

Lieferung 4. 1816.

LXXVI. *Sphaeria atrovirens* Alb. et Schw. (α. *visci*); LXXVII. *Sphaeria cruenta* Nobis; LXXVIII. *Sphaeria macularis* Fries (α. *populnea*); LXXIX. *Stilbospora Fugax* Nobis; LXXX. *Hysterium Rubi* Pers.; LXXXI. *Hysterium melaleucum* Fries; LXXXII. *Phacidium coronatum* Fries; LXXXIII. *Eurotium epixylum* Nobis; LXXXIV. *Roestelia cancellata* Rebent.; LXXXV. *Aecidium Taraxaci* Nobis; LXXXVI. *Uredo Cruciferarum* de Lam. et de Cand. (δ. *Armoraciae* Nobis); LXXXVII. *Uredo Petasitis* de Lam. et de Cand.; LXXXVIII. *Uredo Capraearum* de Lam. et de Cand.; LXXXIX. *Uredo pustulata* Pers. (γγ. *Vaccinii* Alb. et Schw.); XC. *Uredo Fabae* de Lam. et de Cand.; XCI. *Puccinia Pruni spinosae* Pers.; XCII. *Puccinia Menthae* Pers.; XCIII. *Puccinia Artemisiarum* Nobis (γ. *Artemisiarum maritimae*); XCIV. *Phragmidium bulbosum* Link; XCV. *Cyathus striatus* Pers.; XCVI. *Merisma foetidum* Pers.; XCVII. *Geoglossum glabrum* Pers.; XCVIII. *Leotia mitrula* Pers.; XCIX. *Erineum populinum* Pers.; C. *Cronartium asclepiadeum* Fries.

Lieferung 5. 1816.

CI. *Sphaeria stigma* Pers.; CII. *Stilbospora sphaerosperma* Pers.; CIII. *Fusidium griseum* Dittm.; CIV. *Hysterium Corni* Nobis; CV. *Xyloma acerinum* Pers. (β. *Pseudoplatani* Hoppe); CVI. *Phacidium dentatum* Nobis; CVII. *Tubercularia vulgaris* Pers.; CVIII. *Sclerotium populneum* Pers.; CIX. *Stemonitis Fasciculata* Pers.; CX. *Aecidium cornutum* Pers.; CXI. *Aecidium Tussilaginis* Pers.; CXII. *Uredo Sonchiarvensis* Pers.; CXIII. *Uredo tremellosa* Strauss (δ. *Cacaliae suaveolentis* Nobis); CXIV. *Uredo mixta* Link; CXV. *Uredo Phaseoli* Strauss; CXVI. *Uredo Aegopodii* Strauss; CXVII. *Puccinia Polygoni amphibii* Pers.; CXVIII. *Puccinia verrucosa* L.; CXIX. *Puccinia Clinopodii* de Cand.; CXX. *Phragmidium obtusum* L.; CXXI. *Polythrincium Trifolii* Kunze; CXXII. *Geoglossum hirsutum* Pers.; CXXIII. *Taphria populina* Fries; CXXIV. *Phyllerium sorbum* Fries; CXXV. *Erineum roseum* Schultz.

Lieferung 6. 1817.

CXXVI. *Sphaeria cohaerens* Pers.; CXXVII. *Sphaeria rubra* Fries; CXXVIII. *Sphaeria lata* Pers. (β. *glebulosa* Pers. in litt.); CXXIX. *Sphaeria Anethi* Pers.; CXXX. *Sphaeria salicina* Pers.; CXXXI. *Sphaeria dryina* Pers.; CXXXII. *Sphaeria setacea* Pers.; CXXXIII. *Sphaeria pityophila* Nobis; CXXXIV. *Hysterium contortum* Ditm.; CXXXV. *Hysterium pinastri* Schrad.; CXXXVI. *Coryneum pulvinatum* Kunze; CXXXVII. *Sclerotium inclusum* Pers. in litt.; CXXXVIII. *Exosporium Rubi* Nees ab Esenb. in litt.; CXXXIX. *Peridermium Pini* Link (α. *corticola*); CXL. *Peridermium columnare* Link; CXLI. *Peridermium elatinum* Link;

CXLII. *Aecidium rubellum* Gmel. (α. *Rumicis* Pers.); CXLIII. *Uredo epitea* Kunze; CXLIV. *Uredo tremellosa* de Str. (*ringentium*, α α *Euphrasiae*); CXLV. *Uredo scutellata* Pers.; CXLVI. *Uredo Ficariae* Alb. et Schw.; CXLVII. *Puccinia valantiae* Pers.; CXLVIII. *Puccinia asarina* Kunze; CXLIX. *Tremella spiculosa* Pers.; CL. *Peziza abietis* Pers.

Lieferung 7. 1817.

CLI. *Sphaeria Fragiformis* Pers.; CLII. *Sphaeria striaeformis* Pers. (ββ. *Junci* Alb. et Schw.); CLIII. *Sphaeria Pini* Alb. et Schw. (α. *Pini*); CLIV. *Sphaeria pustulata* Hoffm.; CLV. *Sphaeria circumscripta* Nobis; CLVI. *Sphaeria Coryli* Batsch.; CLVII. *Melanconium discolor* Nobis; CLVIII. *Hysterium pulicare* Pers. (β. *betulinum* Nobis); CLIX. *Conoplea hispidula* Pers.; CLX. *Coryneum disciforme* Nees ab Esenbeck; CLXI. *Xyloma populinum* Pers.; CLXII. *Xyloma Spiraeae* Kunze; CLXIII. *Calicium trachelinum* Achar.; CLXIV. *Aecidium Prenanthis* Pers.; CLXV. *Aecidium Melampyri* Nobis; CLXVI. *Aecidium rubellum* Gmelin. (γγ. *Serratulae* Alb. et Schw.); CLXVII. *Aecidium crassum* Pers.; CLXVIII. *Aecidium Euphorbiae* Pers.; CLXIX. *Uredo polymorpha* (ε. *Pyrolae* v. Strauss); CLXX. *Uredo sparsa* Nobis; CLXXI. *Uredo suaveolens* Pers.; CLXXII. *Puccinia Violae* de Cand.; CLXXIII. *Puccinia Adoxae* de Lam. et de Cand.; CLXXIV. *Peziza Lecanora* Nobis; CLXXV. *Erineum nervisequum* Nobis.

Lieferung 8. 1818.

CLXXVI. *Sphaeria carpophila* Pers.; CLXXVII. *Sphaeria Trifolii* Pers.; CLXXVIII. *Sphaeria Spartii* Nees ab Esenbeck in litt.; CLXXIX. *Sphaeria flaccida* de Albert. et Schwein.; CLXXX. *Sphaeria inquinans* Pers.; CLXXXI. *Xyloma Bistortae* de Cand.; CLXXXII. *Fusidium septatum* Nobis; CLXXXIII. *Actinothyrium graminis* Kunze; CLXXXIV. *Chaetomium elatum* Kunze; CLXXXV. *Aecidium Periclymeni* Schumacher; CLXXXVI. *Aecidium Sii Falcariae* Pers. (ββ. *Bupleuri longifolii* Nobis); CLXXXVII. *Uredo Padi* Nobis; CLXXXVIII. *Uredo Ruborum* de Lam. et de Cand.; CLXXXIX. *Uredo ambigua* de Cand.; CXC. *Uredo sitophila* Ditmar; CXCI. *Puccinia conglomerata* Nobis; CXCII. *Puccinia Bistortae* de Cand.; CXCIII. *Thelephora terrestris* Pers.; CXCIV. *Spatularia flavida* Pers.; CXCV. *Morchella costata* Pers.; CXCVI. *Trentepohlia aurea* Martius; CXCVII. *Phyllerium juglandinum* Fries; CXCVIII. *Phyllerium nervale* Nobis; CXCIX. *Phyllerium viteum* Fries; CC. *Erineum betulinum* Schumacher.

Lieferung 9. 1819.

CCI. *Sphaeria flavovirens* Pers.; CCII. *Sphaeria rimosa* (β. *atra* Alb. et Schw.); CCIII. *Sphaeria scabra* Schmidt; CCIV. *Sphaeria bifrons* Nobis; CCV. *Sphaeria Ostruthii* Fries; CCVI. *Sphaeria chionea* Ehrenberg; CCVII. *Sphaeria Dianthi* Alb. et Schw. (β. *Saponariae* Nobis); CCVIII. *Melanconium betulinum* Nobis; CCIX. *Hysterium pithyum* Nobis; CCX. *Aecidium Allii ursini* Pers.; CCXI. *Aecidium Sii Falcariae* Pers.; CCXII. *Uredo Tussilaginis* Pers.; CCXIII. *Uredo pustulata* (α. *Epilobii* Pers.); CCXIV. *Uredo cylindrica* Strauss; CCXV. *Uredo Geranii* de Cand.; CCXVI. *Uredo Cytisi* (β. *nigricantis* Strauss); CCXVII. *Uredo Ornithogali* Nobis; CCXVIII. *Uredo violacea* Pers. (α. *Silenes nutantis*); CCXIX. *Uredo segetum* Pers. (α. *Hordei vulgaris*); CCXX. *Puccinia Ulmariae* de Cand.; CCXXI. *Puccinia Saginae* Nobis; CCXXII. *Erysibe macropus* Mart.; CCXXIII. *Sepedonium mycophilum* Link; CCXXIV. *Helvella flavovirens* N.E.; CCXXV. *Oidium fructigenum* Schmidt.

DISCOMYCETAE EXSICCATAE. Fasc. 1-3. Numbers 1-75. Nov. 1, 1954 - in progress. Ithaca, N.Y.

Korf, Richard Paul (1925-), and Gruff, Susan C. (1953-)

DATES OF PUBLICATION: From schedae.

Fasc.	Number	Date
1	1-25	Nov 1, 1954
2-3	26-75	Jul 24, 1978

Notes: Fascicles 2-3 were issued under the joint authorship of Korf and Gruff under the name *Discomycetes Exsiccati.*

References: Stevenson p. 237-238. Mycologia 46: 837-841. 1954. Mycotaxon 7: 185-203. 1978.

BPI, FH (fasc. 2,3), CUP, UPS, NY, PC.

DR. PHIL. WIRTGEN: HERBARIUM PLANTAE CRITICAE, SELECTAE, HYBRIDAE FLORAE RHENANAE. (Edit. Nov.) Abteilung II. Numbers 1-100.

Andres, Heinrich (1883-)

DATES OF PUBLICATION: Not known exactly; mid-1930's or later; accessioned FH 19 Mai 1939.

Notes: Printed, numbered labels were used. The title, *Flora Exsiccata Rhenana*, was used for different sets issued as noted in Hedwigia 49: (132), 1910. Numbers 85-100 were said to be cryptogams.

ECONOMIC FUNGI. Fasc. 1-11. Numbers 1-550. 1890-1899. Cambridge, MA. Suppl. A. 1895. Suppl. B. 1895. Suppl. C. 1903, 1905.

Seymour, Arthur Bliss (1859-1933) and Earle, Franklin Sumner (1856-1929).

DATES OF PUBLICATION: From Stevenson p. 374-383.

Fasc.	Numbers	Dates	
1	1-50 (4 extra)	Jan 1, 1890	Bot. Centralb. 41(9): 287. 1890. (26 Feb).
2	51-100 (7 extra)	Jan 1, 1891	
3-4	101-200 (15 extra)	Sep 1, 1892	
5	201-250 (17 extra)	Feb 1, 1893	
6-8	251-400 (46 extra)	Mai 1, 1893	
9	401-450 (4 extra)	Jul 1, 1895	
10	451-500 (15 extra)	Oct 15, 1897	
11	501-550 (4 extra)	Jun 7, 1899	
Suppl. A	A1-A10 (2 extra)	Apr 5, 1899	
Suppl. B	B1-B30 (5 extra)	Apr 5, 1899	
Suppl. C	C1-C100	Jun 1, 1903	
	C101-150	Jun 12, 1905	

References: Lindau and Sydow numbers 24727, 24728, 24729. Bot. Kal. 1899. p. 120. TL-2/1: 716.

Notes: Suppl. C was edited by George P. Clinton and contained Ustilaginales.

FH, BPI, CUP, BM (list), NY, HBG (partial).

ELVELLACEI BRITANNICI EXSICCATI. Fasc. 1-4. Numbers 1-201 (3 Extra). 1874-1881. Shrewsbury, England.

Phillips, William (1822-1905).

DATES OF PUBLICATION: From title page and reviews.

Fasc.	Numbers	Dates title pages	Reviews
1	1-50	1874	Grevillea 3(27): 131. 1875. (Mar)
2	51-100	1875	Grevillea 4(30): 84. 1875. (Dec)
3	101-150	1877	Grevillea 5(36): 157, 163. 1877. (Jun)
4	151-201 (4 bis, 17 bis, 40 bis)	1881	Bot. Centralb. 8(3): 91. 1881.

Notes: New species were described in fascicle 3 with Latin descriptions. Indices are present with each fascicle. New species in fascicle 3 were no. 122. *Peziza pallido-verescens* Phill., no. 133. *Helotium advenulum* Phill. Two varieties were listed as "mihi": *Peziza scutula* var. *fucata*, and *P. scutula* var. *Lysimachiae*. These had no descriptions. No. 139. *Ascobolus lacteus* C. & Phill., no. 144. *Dermatea haughtonii* Phill. were listed as new species but lacked descriptions. No. 70. *P. controversa* Cooke, no. 83. *P. ulcerata* Phillips & Plowright were also proposed without description, as were no. 172. *P. filicum* Phill. and no. 177. *D. urticola* Phill.

The first fascicle was sold for 12/- . Issued in maroon folders.

References: Lindau and Sydow numbers 20639, Bot. Kal. 1899. p. 119.
TL-2/4: 244.

FH, S.

ERBARIO CRITTOGAMICO ITALIANO. Series I. Fasc. 1-30. Numbers 1-1500. 1858-1867. Genoa. Series II, Fasc. 1-30. 1868-1885. Genoa (Fasc. 1-13), Milano (Fasc. 14-30).

Baglietto, Francesco (1826-1916), Cesati, Vincenzo de (1806-1883), Notaris, Giuseppe de (1805-1877), and others.

DATES OF PUBLICATION: From Sayre p. 20, who cited title pages and Lynge.

Series I

Fasc.	Numbers	Date
1	1-50	Feb 1858
2	51-100	Jul 1858
3	101-150	Dec 1858
4	151-200	Jun 1859
5	201-250	Jun 1859
6	251-300	Dec 1859
7	301-350	Feb 1860
8	351-400	Mai 1860
9	401-450	Aug 1860

10	451-500	Aug 1860
11	501-550	Feb 1861
12	551-600	Mai 1861
13	601-650	Aug 1861
14	651-700	Nov 1861
15	701-750	Feb 1862
16	751-800	Mai 1862
17	801-850	Jul 1862
18	851-900	Oct 1862
19	901-950	Jan 1863
20	951-1000	Jan 1863
21	1001-1050	1863
22	1051-1100	1863
23	1101-1150	1864
24	1151-1200	1864
25	1201-1250	1865
26	1251-1300	1865
27	1301-1350	1866
28	1351-1400	1866
29	1401-1450	1867
30	1451-1500	1867

Series II

Fasc.	Numbers	Date	
1	1-50	[Dec 1867] Jan 1868	Announced Bot. Zeitung 26(11): 183. 1868.
2	51-100	Mai 1868	
3	101-150	Dec 1868	
4	151-200	Mar 1869	
5	201-250	Nov 1869	
6	251-300	Feb 1870	
7	301-350	Mai 1870	
8	351-400	Jan 1871	
9	401-450	Apr 1871	
10	451-500	Jul 1871	
11	501-550	Oct 1871	Bot. Centralb. 1(13): 414. 1880.
12	551-600	Jan 1872	
13	601-650	Jun 1872	Bot. Zeitung 31(9): 144. 1873.
14	651-700	Mai 1878	Bot. Zeitung 37(10): 159. 1879.
15	701-750	Oct 1878	
16	751-800	Apr 1879	Bot. Zeitung 37(38): 614. 1879.
17	801-850	Apr 1879	
18	851-900	Nov 1879	
19	901-950	1880	Bot. Zeitung 38(24): 421. 1880.
20	951-1000	1880	Bot. Centralb. 2(10): 320. 1881. Bot. Zeitung 39(8): 130. 1881.
21	1001-1050	Apr 1881	Bot. Zeitung 39(22): 359. 1881.
22	1051-1100	Apr 1881	Bot. Centralb. 2(23): 362. 1881.
23	1101-1150	Mar 1882	
24	1151-1200	Mar 1882	
25	1201-1250	Dec 1882	
26	1251-1300	Dec 1882	
27	1301-1350	Feb 1884	
28	1351-1400	Feb 1884	
29	1401-1450	Nov 1885	
30	1451-1500	Nov 1885	

Notes: New fungi were described with Latin descriptions as were several new genera. There were numerous authors over the years of issuance; those who were major contributors of fungi were F. Bagliotto, L. Caldesi, V. Cesati, A. Daldini, G. De Notaris, M. Anzi, G. Passerini, F. Hansmann, and G. Venturi.

References: Lindau and Sydow numbers 1468, 8060, 8061. TL-2/1: 90.

FH, BPI, (No. 36-100, Ser. II no. 36-187, 901-1500), UPS (Series I, 1-1500), S, BM (list).

EUMYCETES SELECTI EXSICCATI. Lieferung 1-32. Numbers 1-800. 1922-1936. Vienna.

Weese, Josef (1888-1962)

DATES OF PUBLICATION: From Stevenson p. 498-502, and reviews.

Lieferung	Numbers	Date	
1	1-25		
2	26-50		
3	51-75	Received FH 1923	
4	76-100		
5	101-125		
6	126-150		
7	151-175	Received FH 1924	
8	176-200	Received FH June 1924	
9	201-225	1925	
10	226-250	1926	
11	251-275	1926	Herbarium 2: 273. 1927.
12	276-300	1927	
13	301-325	1928	Herbarium 2: 313. 1929.
14	326-350	1928	
15	351-375	1929	Herbarium 2: 358. 1930.
16	376-400	1930	
17	401-425	1930	
18	426-450	1930	
19	451-475	1930	
20	476-500	1931	
21	501-525	1931	
22	526-550	1932	
23	551-575	1932	
24	576-600	1933	
25	601-625	1933	
26	626-650	1933	
27	651-675	1934	
28	676-700	1934	
29	701-725	1934	
30	726-750	1935	
31	751-775	1936	
32	776-800	1938	

Notes: There were few nomenclatural novelties in this set. Numbers 1-250 were listed in Herbarium 2: 273. 1927. From Lieferung 9 onward, schedae were printed in Mitteilungen aus dem botanischen Institut der Technischen Hochschule in Wien.

FH, BPI, UPS

EXSICCATA HYPODERMEARUM GALLIAE ORIENTALIS. Decades 1-5. Numbers 1-50. 1897-1898.

Maire, René (1879-1949) and Marguery, Felix (-)

DATES OF PUBLICATION: From labels and reviews.

Dec.	Number	Date	
1	1-10	1897	
2	11-20	1897	Bot. Centralbl. 71(3): 96. 1897 (14 Jul).
3	21-30	1897	Bot. Centralbl. 72(12): 395. 1897 (15 Dec).
4	31-40	1898	Bot. Centralbl. 75(11): 344. 1898 (7 Sep).
5	41-50	1898	Bot. Centralbl. 77(1): 12. 1899 (28 Dec).

Notes: Schedae were published as follows: Monde des Plantes 6(89): 97-99, 140-141, 1897; 7(103): 117-120. 1898.

The papers listed above provide lists of the contents of the decades and give the authors' observations on the species. All material is from the Uredinales. Most identifications have been checked by Saccardo. Fascicles were sold for 10 francs.

References: Bot. Kal. 1899. p. 119. TL-2/3: 257.

FH (with some missing numbers), BPI, S, C (dist.)

EXSICCATENSAMMLUNG.

Jenner, Th.

Notes: The following series have been listed in *Herbarium* and are said to contain fungi. No copies have been seen.

Ser. 8 *Herbarium* 1: 43. 1908. 18 Mounted; 6 loose.
Ser. 17 *Herbarium* 1: 103. 1910.

FLORA BOHEMIAE ET MORAVIAE EXSICCATA. Ser. II. Abt. 1. Pilze. Lief. 1-47, Numbers 1-2575.

Petrak, Franz (1886-1973)

DATES OF PUBLICATION: From FH accession lists and the journal *Herbarium*.

Lief.	Numbers	
1-10	1-500	*Herbarium* 1(28): 254. 1912.
1-11	501-550	*Herbarium* 1(29): 262. 1912. Numbers 1-550 were received as a unit at FH on 14 January 1913.
12-13	551-650	*Herbarium* 1(29): 278. 1913, FH. 21 March 1913.
14-15	651-750	*Herbarium* 1(31): 292. 1913.
16-18	751-900	*Herbarium* 1(34): 309. 1913.
19-21	901-1050	Aug. 1914. FH.
22-29	1051-1450	1920. *Nachtrag*. 23 specimens. Jan. 1920.
30-31	1451-1500	1921
32-33	1501-1900	1924
34-38	1901-2100	1925
39-42	2101-2300	1927
43-47	2301-2575?	1928

Notes: While specimens were handled by Weigel, issuance of the set was fairly orderly. After about March 1914, Petrak distributed sets himself. He wrote in a letter to Farlow dated March 1914, "*Very unpleasant experiences* compelled me to sever *all* connexion with that firm and in future the continuation of the *exsiccata* will be delivered only to those of *my* subscribers who order it *directly* from me." The difficulties with Weigel's firm were detailed no further.

FH, BPI, S, C (dist.), HBG. Numerous other sets listed by Stafleu and Cowan in TL-2/4:205.

FLORA CRYPTOGAMICA BOËMIAE. Böheims Kryptogamische Gewächse, Herausgegeben von Phillip Maximilian Opiz. Fasc. i-viii, numbers 1-200. 1818-1819. Prague.

Opiz, Phillip Maximilian (1787-1858)

DATE OF PUBLICATION: From Flora.

Fascicle	Numbers	Date	
1	1-25	1818	Flora 1818: 242-244.

Notes: The following fungi were issued in fascicle 1 (the only one for which I have found a record): nos. 21. *Sphaeria laburni* Pers., 22. *S. acuta* Pers., 23. *Xylomia Padi* Funk, 24. *Aecidium cornutum* Pers., 25. *Erineum betulinum* Pers.

TL-2/3:839. 1981.

FLORA LITUANA EXSICCATA, FUNGI PARASITICI. Fasc. I. Numbers 1-20. 1932.

[Minkevicius] Minkyavichyus , Antanas I. (-)

DATE OF PUBLICATION: From FH set.

Fascicle	Numbers	Date
1	1-20	1932

DATES OF PUBLICATION: All collections were made in 1932. No new species were included.

FH, BPI, S.

FLORA LUSITANICA EXSICCATA. Cent. 1-19. Numbers 1-1900. 1886-1911. Universitade Coimbra.

Henriques, Julio Angusto (1838-1928)

DATES OF PUBLICATION: From Schedae published in Bol. Soc. Brot. were included in the following:

Cent.	Numbers	Date
11	1001-1100	Bol. Soc. Brot. 9: 245-254. 1891.
12	1101-1200	Bol. Soc. Brot. 10: 186-195. 1892.

13	1201-1300	Bol. Soc. Brot. 11: 91-100. 1893.
14	1301-1400	Bol. Soc. Brot. 12: 161-170. 1895.
17	1601-1700	Bol. Soc. Brot. 18: 141-151. 1902..
18	1701-1800	Bol. Soc. Brot. 21: 166-174. 1905.

Notes: None of the fungi issued were described as new.

References: Lindau and Sydow no. 8866; Sayre p. 24; TL-2/2: 160.

FLORA MOLDAVIAE ET DOBROGEAE EXS.

T. Ahti says 101-116, 201-211 are fungi.

FLORA OLTENIAE EXSICCATA A HORTO BOTANICO INSTITUTI AGRONOMICI "TUDOR VLADIMIRESCU" CRAIOVENSIS EDITA. Cent. 2,6,9. Numbers 101-200, 501-600, 801-900. 1965, 1967, 1971. Craiova, Romania.

Buia, Alexandru (1911-1964), Pāun, Marin (1924-), Comes, I. (-), Ene, Il. (-), Costescu, M. (-), Glodeanu, G. (-), Vanca, Ana (-).

DATES OF PUBLICATION: From Schedae.

Cent.	Numbers	Date
2(1)	101-200	1965
6(2)	501-600	1967
9(3)	801-900	1971

Notes: To my knowledge, these are the only centuries which contain fungi. Schedae were separately published. No new species were included.

FH, BPI, UPS, NY, PC (all but the first century dist.)

FLORA ROMANIAE EXSICCATA. Horto et Museo Botanico Universitatis Clujensis Edita. Cent. 1-25. Numbers 1-2500. Cluj. 1921-1965.

Note: Fungi were included in at least certain centuries. I have not studied the schedae.

FLORA SCHEMNITZIENSIS OR FUNGI SCHEMNITZIENSIS.

Kmet, Andreas (1841-1908)

Note: Urban (p. 277) records the title as *Fungi Schemnitziensis*, where others such as Grumann cite it as *Flora Schemnitziensis*. I have never seen this material and do not have information on the contents of the set.

References: Gola p. X, Grumann p. 670 Bogusław Sałata in Gryzyby (Mycota) VI. 1974.

FORSTSCHADLICHE PILZE HERAUSGEGEBEN VON F. W. NEGER, THARANDT. Lief. 1-7. Numbers 1-175. 1916-1921. Tharandt. Verlag von Theodor Oswald Weigel, Leipzig.

Neger, Franz Wilhelm (1868-1923).

DATES OF PUBLICATION: From Reviews.

Lief.	Numbers	
1	1-25	Hedwigia Beibl. 58(2): (150). 1916 (Sep), 59(2): (139). 1917 (Jul)
2	26-50	Hedwigia Beibl. 60(1): (92). 1918 (Feb)
3,4	51-100	Hedwigia Beibl. 60(2): (177). 1918 (Nov)
5	101-125	Herbarium 1(47): 448. 1919.
6	126-150	
7	151-175	Hedwigia Beibl. 62(2): (146). 1921 (Apr)

Notes: Most fascicles were offered for sale at 10 marks.

FH (lief. 7 only), BPI (lief. 7 only), NY (incomplete), HBG.

FUNGI ALBANICI ET BOSNIACI EXSICCATI. Numbers 1-200. 1921.

Petrak, Franz (1886-1973)

DATES OF PUBLICATION: Received at FH in 1921.

Notes: Labels have printed titles; however, numbers, names, and localities are all handwritten. See TL-2/4: 205.

FH, NY

FUNGI AMERICANI EXSICCATI. Cent. 1-8. Numbers 1-800. 1878-1882. London.

Ravenel, Henry William (1814-1887) and Cooke, Mordecai Cubitt (1825-1914).

DATES OF PUBLICATION: See Stevenson p. 307-315.

Century	Numbers	Date	
1	1-100 (4 extra)	1878	Bot. Zeitung 37(18): 295. 1879.
2	101-200 (4 extra)	1878	
3	201-300	1879	
4	301-400 (3 extra)	1879	
5	401-500 (7 extra)	1881	
6	501-600 (7 extra)	1881	
7	601-700 (5 extra)	1882	
8	701-800	1882	

References: Lindau and Sydow number 21809a, Bot. Kal. 1899. p. 120. TL-2/4: 597.

FH, BPI (3 sets), CUP, S. BM (list).

FUNGI AUSTRIACI EXSICCATI. Cent. 1-13. Numbers 1-1300. 1871-1875. Teplitz (Dresdae).

Thümen, Felix Karl Albert Ernst Joachim de (1839-1892)

DATES OF PUBLICATION: Title page and reviews. Announced Bot. Zeitung 29(49): 842. 1871.

Cent.	Numbers	Date	
1	1-100	1871	Hedwigia 11(2): 22. 1872; Bot. Zeitung 30(9): 143. 1872 (1 Mar)
2	101-200	1871	
3	201-300	1872	Hedwigia 11(6): 91. 1872.
4	301-400	1872	Hedwigia 12(4): 62. 1873. Bot. Zeitung 31(9): 144. 1873 (28 Feb).
5	401-500	1872	
6	501-600	1872	
7	601-700	1873	
8	701-800	1873	
9	801-900	1874	
10	901-1000	1874	
11	1001-1100	1874	
12	1101-1200	1874	
13	1201-1300	1875	Grevillea 3(28): 163. 1875 (Jun).

Notes: A few new species were proposed by de Thuemen, Kruck, and Kirchner. Descriptions are in Latin. There are also some new combinations. Indices for Cent. 1-8 and 13 were issued with specimens.

References: Lindau and Sydow number 26621, Bot. Kal. 1899. p. 120.

FH, BPI (? 4-1949), UPS, S, BM (list).

FUNGI AUSTRO-AMERICANI EXSICCATI. Fasc. 1-18. Numbers 1-360. 1904-1911. Feldkirch, Austria.

Rick, Johann (1869-1946)

DATES OF PUBLICATION: From Stevenson p. 338-344.

Fasc.	Numbers	Date
1	1-20	1904
2	21-42, 21a	1905
3-4	43-80, 75a	1906
5-6	81-120	Mai 1907
7-8	121-160	Mai 1907
9-10	161-200, 180a, 180b	Jan 1908
11-15	201-300	Apr 1910
16-18	301-360	1911

Notes: Miscellaneous types were issued, described by Rick and Theissen in Ann. Mycologici. Ann. Myc. 2:406. 1904; 3:15. 1905; 4:309. 1906; 5:28. 1907; 5:335. 1907; 6:105. 1908; 9:175. 1911. A "beigabe" series I-IX are in FH. These all have handwritten labels.

References: Lindau and Sydow numbers 22257, 22259, 22262, 38369. TL2/4: 780.

FH (and dist.), BPI, S, PC (dist.)

FUNGI BAVARICI. Cent. 1-10. Numbers 1-1000. 1890-1909. München (Cent. 1-7), Gerolzhofen (Cent. 8-10).

Allescher, Andreas (1828-1903)
Schnabl, Johann Nepomuk (1853-1899), and
Vill, August (1851-1930)

DATES OF PUBLICATION: From title page; FH accession list, Bot. Centralbl.

Cent.	Numbers	Date	
1	1-100	t.p. 1890	
2	101-200	t.p. 1891	
3	201-300	t.p. 1893	
4	301-400	t.p. 1894	Bot. Centralbl. 61(2): 47. 1895 (9 Jan)
5	401-500	t.p. 1895	
6	501-600	t.p. 1897	Indexed FH 14.XII.1897.
7	601-700	t.p. 1900	Bot. Centralbl. 83(6): 196-197. 1900 (8 Aug).
8 (I)	701-800	t.p. 1904/5	Indexed FH Jan 6, 1909
9 (II)	801-900	t.p. Nov 1907	Indexed FH Jan 7, 1909
10 (III)	901-1000	t.p. Aug 1909	Rec'd FH Nov 20, 1909.

Notes: Cent. 8-10 were edited by Vill. Some diagnoses and descriptions of new species included in the sets are found in Allg. Bot. Z. Syst. 1: 25-26. 1895; Ber. Bayr. Bot. Ges. 1: 62-71. 1891. Some additional numbers were issued irregularly as a "b" series.

Schedae for Century 4 is in Bot. Centralbl. Beih. 5: 133. 1895.

References: TL-2/1: 33.

FH, BPI, S, C (dist.), PC (1-900), HGB (1-900).

FUNGI BIALOWIEZENSES EXSICCATI, EDITIO MUSEI HIST. NAT. IN BIALOWIEZA (Polonia). (Grzyby Puszezy Bialowieskiej). Cent. 1-2. Numbers 1-200. 1923. 1925. Skierniewice (Cent. 1), Warszawa (Cent. 2).

Siemaszko, Wincenty (1887-1943)

DATES OF PUBLICATION: From title page.

Cent.	Numbers	Dates
1	1-100	Oct 1923
2	101-200	1925

Notes: Schedae were published separately in 1923 and 1925. No new species were found. The schedae with the FH set have a number of hand corrections and additions.

FH, BPI, CUP, UPS (Cent. 2 only).

FUNGI BRITTANNICI. Cent. 1-2. Numbers 1-200. 1873, 1875.

Vize, John Edward (1830/31-1916)

DATES OF PUBLICATION: Title page and Grevillea

Cent.	Number		
1	1-100	1873	Grevillea 2(17): 78. 1873 (Nov).
2	101-200	1875	Grevillea 3(28): 164. 1875. (Jun).

Notes: Offered in Grevillea 2 for one pound. Cooke (Grevillea 3) commented that "Some of the specimens seem rather too scant for practical purposes." Both Centuries were noted in Hedwigia 15: 101. 1876.

References: Lindau and Sydow number 27878.

FH, BPI, BM (list)

FUNGI BRITTANICI EXSICCATI a M. C. COOKE COLLECTI. Series I, Cent. 1-7. Numbers 1-700. 1865-1873. London. Series II, Cent. 1-7, Numbers 1-700. 1875-1879. Covent Garden.

Cooke, Mordecai Cubitt (1825-1914)

DATES OF PUBLICATION: From the set and from cited journals.

Ser. I	Cent.	Numbers		
	1	1-100	1865	Hedwigia 5(1): 14. 1866. Bot. Zeitung 24(17): 135. 1866.
	2	101-200	1866	Hedwigia 5(12): 182. 1866.
	3	201-300		Hedwigia 6(10): 153. 1867.
	4	301-400	1870	Hedwigia 10(11): 167-169. 1871.
	5	401-500		Hedwigia 11(3): 40-41. 1872.
	6	501-600		Hedwigia 12(4): 61-62. 1873 (Apr).
	7	601-700		Hedwigia 13(8): 138. 1874 (Aug).
Ser. II	1	1-100	1875	Grevillea 3(28): 165. 1875 (Jun).
	2	101-200	1875	Numbers from these centuries were listed in Grevillea 5(33): 38-45. 1876.
	3	201-300	1875	
	4	301-400	1876	
	5	401-500	1876	Grevillea 5(33): 48. 1876 (Sep).
	6	501-600	1877	Grevillea 6(38): 56. 1877 (Dec).
	7	601-700	1879	Grevillea 8(45): 21. 1879 (Sep).

Notes: Indices were published in Grevillea 5: 38-45, 65-73. 1876, 5: 99-101. 1877. Corrections and discussions are found in Grevillea 4: 130. 1876, 8: 21. 1879. A note in Grevillea 3: 77. 1874 stated that centuries cost one guinea. Specimens were mounted differently in the two series. In the first series, the specimens were mounted singly on smaller sheets. In the second series, specimens were mounted four per page on sheets with printed titles. All other information was written by hand. Spore drawings often accompanied specimens.

References: Lindau and Sydow number 5566, TL-2/1:536. Bot. Kal. 1899. p. 119.

FH (lacking Ser. 1 Cent. 3), UPS, S (Ser. I, Ser. II. 5-7), BM (list), PC (Ser. 2).

FUNGI CAROLINIANI EXSICCATI. Fasc. 1-5. Numbers 1-100 in each fasc. 1852-1860. Charleston, S.C.

Ravenel, Henry William (1814-1887).

DATES OF PUBLICATION: See Stevenson p. 297-306.

Fasc.	Numbers	Date
1	1-100	1852
2	1-100	1853
3	1-100	1855
4	1-100	1855
5	1-100	1860

Notes: In a letter to Farlow of March 19, 1887, only about four months before his death, Ravenel lists the recipients of this set. Of those listed, 11 were gifts to M. J. Berkeley, E. M. Fries, W. H. Alarvey, C. Montagne, W. Nylander, M. A. Curtis, H. P. Parcher of Charleston, E. Herlback of Charleston, Smithsonian Institution, Academy of Sciences Philadelphia, and T. M. Peters. The remainder were sold.

Curtis's set is in FH.
References: TL-2/4:597.
FH (and a second set containing fasc. 3, 4, 5 and partial set dist.), BPI, UPS, BM (list), PC (partial set).

FUNGI CARPATICI LIGNICOLI EXSICCATI. Fasc. 1-5. Numbers 1-265. 1933-1948.

Pilát, Albert (1903-1974)

DATES OF PUBLICATION: From FH accession lists.

Fasc.	Numbers	Date Indexed FH
1	1-50	Mai 1933
2	51-100	Oct 1933
3	101-150	Mar 1948
[4]	151-200	Mar 1948
[5]	201-265	Mar 1948

Notes: Mimeographed indices are present with some of these fascicles. The set was announced as in preparation in Hedwigia 73:197. 1933. No new species were found. Labels were printed, but the fungus names and parts of the localities were added later with a rubber stamp.

References: TL-2/4: 263.

FH, BPI, NY, PC

FUNGI COLUMBIANI. Cent. 1-51. Numbers 1-5100. 1893-1917. Newfield, N.J., Takoma Park, M.D., Stockton, Kan.

Ellis, Job Bicknell (1827-1905), Everhart, Benjamin Matlack (1818-1904), Shear, Cornelius Lott (1865-1956), Bartholomew, Elam (1852-1934).

DATES OF PUBLICATION: See Stevenson p. 139-164.

Notes: Editorship of centuries is shown below.

Cent.	
1-14	J. B. Ellis and B. M. Everhart--Oct 1893-1899. Newfield, NJ.
15	C. L. Shear--Mar 1901. Takoma Park, MD.
16-51	E. Bartholomew--Dec 1901-Feb 10, 1917. Stockton, KS.

Cent.	Numbers	Date
1	1-100 (+3)	Oct 1893
2	101-200 (+12)	1893
3	201-300 (+2)	1894
4	301-400 (+2)	1894
5	401-500 (+3)	1894
6	501-600 (+1)	1894
7	601-700	1895
8	701-800 (+1)	1895
9	801-900 (+2)	1896
10	901-1000 (+1)	1896
11	1001-1100 (+1)	1897
12	1101-1200	1897
13	1201-1300	1898
14	1301-1400 (+1)	1899
15	1401-1500 (+5)	Mar 1901
16	1501-1600	Dec 1901
17	1601-1700	1902
18	1701-1800	1903
19	1801-1900	Dec 28, 1903
20	1901-2000	Nov 15, 1904
21	2001-2100	Mar 20, 1905
22	2101-2200	Jan 30, 1906
23	2201-2300	Dec 10, 1906
24	2301-2400	Mar 15, 1907
25	2401-2500	Dec 10, 1907
26	2501-2600	Jan 10, 1908
27	2601-2700	Dec 25, 1908
28	2701-2800	Feb 5, 1909
29	2801-2900	Mar 5, 1909
30	2900-3000	Dec 1, 1909
31	3001-3100	Mar 15, 1910
32	3101-3200	Apr 5, 1910
33	3201-3300	Dec 15, 1910
34	3301-3400	Jan 5, 1911
35	3401-3500	Nov 30, 1911
36	3501-3600	Dec 20, 1911
37	3601-3700	Mar 20, 1912
38	3701-3800	Oct 30, 1912
39	3801-3900	Dec 10, 1912
40	3901-4000	Apr 1, 1913
41	4001-4100	Oct 15, 1913
42	4101-4200	Nov 15, 1913
43	4201-4300	Apr 20, 1914
44	4301-4400	Sep 10, 1914
45	4401-4500	Oct 10, 1914
46	4501-4600	Feb 20, 1915
47	4601-4700	Sep 20, 1915
48	4701-4800	Dec 1, 1915
49	4801-4900	Nov 15, 1916
50	4901-5000	Dec 15, 1916
51	5001-5100	Feb 10, 1917

References: Stevenson p. 139-164, TL-2/1: 742.

FH (including set from Bartholomew's Herbarium and duplicates from his herbarium), BPI, CUP, UPS (dist.), S, HBG.

FUNGI DAKOTENSES. Fasc. 1-27. Numbers 1-675. Nov 1908-Oct 1929. Kulm, S. Dak. (fasc. 1-22) and Northville, S. Dak. (fasc. 23-27).

Brenckle, Jacob Frederick (1875-1958)

DATES OF PUBLICATION: See Stevenson p. 51-59.

Notes: Reviews and notices from fascicle 4 to the last in the series are found in Hedwigia. According to Stevenson's listings, there are several *nomen nuda* among those listed.

Fasc.	Number	Date
1	1-25, 1a, 2a	Nov 1908
2	26-50, 27a, 44a, b, c, 45a, 48a	Mar 1909
3	51-75, 53a, b, 62a, 71a	Oct 1909
4	76-100, 83a, 90a, 96a	Jan 1910
5	101-125, 105a, 111a, b, 114a, 116a, 120a	Aug 1910
6	126-150, 132a, 133a, b	Sep 1911
7	151-175, 153a, 159a, 161a, b	Feb 1912
8	176-200, 180a, 185a, 191a, 192a, 199a	Dec 1912
9	201-225, 201a, 217a, 218a	Jul 1913
10	226-250, 235a, 247a	Nov 1913
11	251-275	Oct 1914
12	276-300, 276a, 277a, 280a, 281a	Dec 1914
13	301-325, 305a, 308a, b, c, 390a	Jul 1915
14	326-350, 332a, 333a, 340a, 341a	Sep 1915
15	351-375, 351a, 355a, 359a, 364a, 367a, 369a	Jan 1916
16	376-400, 379a, 382a	Oct 1916
17	401-425, 412a, 413a	Dec 1916
18	426-450, 434a, 441a	Aug 1917
19	451-475, 462a	Aug 1920
20	476-500, 478a, 484a, 487a, 497a, 499a	Aug 1921
21	501-525, 505a, 506a	Jul 1922
22	526-550, 542a	Jul 1923
23	551-575, 552a	Dec 1924
24	576-600, 578a	Jul 1927
25	601-625, 605a, b, c	Nov 1927
26	626-650, 632a, 637a	Aug 1928
27	651-675, 655a	Oct 1929

Notes: Reviews and notices from fascicle 4 to the last in the series are found in Hedwigia. According to Stevenson's listings, there are several *nomen nuda* among those listed. See TL-2/1:316.

The first two fascicles have mimeographed contents; others are printed. *Lycoperdon dakotensis* Lloyd (no. 50) is described in the schedae. Other new species were included attributed to Rehm, Petrak, Arthur, Saccardo, as well as Brenkle himself. A new genus, *L'abridella* Brenkle, was described in the schedae of fascicle 27 as number 663. It was based upon *L. cornucervae* Brenkle.

FH, BPI, CUP, S, NY

FUNGI EICHLERIANI. Lief. 1-15. Numbers 1-300. 1908-1912. Märhisch-Weisskircher.

Petrak, Franz (1886-1973)

DATES OF PUBLICATION: From Hedwigia & Lindau and Sydow no. 37878

Lief.	Numbers	Date	Reviewed or noted
1	1-25	Nov 1908	Herbarium 1(4): 29. 1908.
2-3	26-75		Herbarium 1(8): 60. 1909.
4	76-100	Jan 1910	Herbarium 1(9): 68. 1909.
5-8	101-200		Hedwigia Beibl. 51(1): (85) 1911 (Jun), Herbarium 1(13): 103. 1910.
9	201-210		Hedwigia Beibl. 51(1):(85), Herbarium 1(20): 158. 1911.
10	211-225		Hedwigia Beibl. 51(2): (168) 1911 (Aug); Herbarium 1(21): 168. 1911.
	226-300		Hedwigia Beibl. 52(2): 153. 1912 (Jun); 53(1): (94). 1912. (Nov). Herbarium 1: 223. 1912.

Note: I have not seen this set, and the only reference to an extant set is in HBG by Friederichsen (Mitt. Inst. Allg. Bot. Harburg 16: 189-193. 1978). Weigel (Herbarium 1: 29. 1908) writes, "Diese Sammlung betrifft den mykologischen Nachlass des verstorbenen Dr. G. Eichler in Teplitz und wird nur Pilze aus Böhmen umfassen, die Dr. Eichler mit bewunderungswürdigen Fleisse und eiserner Ausdauer im Laufe vieler Jahre gesammelt und geradezu überreich aufgelegt hat. Die Lieferungen sollen regalmässig in vierteljährigen Intervallen ausgegeben werden mit gedruckten Schedae und Etiketten."

References: TL-2/4: 205.

FUNGI EUROPAEI EXSICCATI, KLOTZSCHII HERBARII VIVI MYCOLOGICI CONTINVATIO.
SEE HERBARIUM VIVUM MYCOLOGICUM.

FUNGI ESTONICI EXSICCATI. Fasc. 1-3. Numbers 1-150. 1930-1936. Tartu.

Leppik, [Elmar] Emil (1906-)

DATES OF PUBLICATION: From title page; schedae are listed below.

Fasc.	Numbers	Date	
1	1-50	Apr 1, 1930	Inst. Phytopath. Univ. Tartuensis, p. 39-42. 1931.
2	51-100	1934	Ibid. p. 3-7. 1934.
3	101-150	1936	Ibid. p. 1-27. 1936.

Notes: Indices were published with each fascicle. Many identifications were made by V. Litschauer. Schedae were published as separate units and contain, in some cases, extensive notes. The author's name is sometimes spelled Lepik.

References: See Mitt. Phytopath. Versuchsanst. Tartu 1934, 23 pp.

FH, BPI (1-300)?, CUP, S.

FUNGI EXOTICI EXSICCATI. Fasc. 1-25. Numbers 1-1250. Oct. 1912-Sep 1943. Berlin.

Sydow, Hans (1879-1946)

DATES OF PUBLICATION: See Stevenson, p. 402-414.

Fasc.	Numbers	Date	
1	1-50	Oct 1912	Ann. Mycol. 10(4): 351-352. 1912 (10 Aug).
2	51-100	Feb 1913	Ann. Mycol. 11(2): 207-208. 1913 (30 Apr).
3	101-150	Apr 1913	
4	151-200	Sep 1913	Ann. Mycol. 11(4): 388. 1913 (15 Sep).
5	201-250	Mar 1914	Ann. Mycol. 12(2): 238-239. 1914 (15 Mai).
6	251-300	Mar 1914	
7	301-350	Mar 1915	Ann. Mycol. 13(1): 68-70. 1915 (25 Mai).
8	351-400	Mar 1915	
9	401-450	Mar 1915	
10	451-500	Jun 1923	Ann. Mycol. 21(5/6): 345-346. 1923 (15 Oct).
11	501-550	Jun 1923	
12	551-600	Jun 1927	Ann. Mycol. 37(3): 270-274. 1939 (20 Jul).
13	601-650	Jul 1927	
14	651-700	Jul 1927	
15	701-750	Jul 1927	
16	751-800	Jun 1930	Ann. Mycol. 9(4/6): 408-412. 1941 (31 Dec).
17	801-850	Jun 1930	
18	851-900	Jun 1930	
19	901-950	Aug 1934	
20	951-1000	Mar 1939	Ann. Mycol. 40(1/2): 159-161. 1942 (10 Mai).
21	1001-1050	Mar 1939	
22	1051-1100	Sep 1943	Ann. Mycol. 41(4/6): 334-338. 1943 (31 Dec).
23	1101-1150	Sep 1943	
24	1151-1200	Sep 1943	
25	1201-1250	Sep 1943	

Notes: According to Stevenson, Fascicles 22-25, prepared in Berlin during World War II survive only in Stockholm, where Sydow had sent one set, and in BPI where portions of the Stockholm set were deposited. These fascicles do not represent effective distribution. The contents were listed in Ann. Mycol. as shown above. Many type collections were included.

FH (1-15 partial sets dist.), BPI, CUP, UPS (1-1250), S, C (dist.), PC (dist.), HBG (partial).

FUNGI EXSICCATI FENNICI. Fasc. 1-20. Numbers 1-1000. 1957-1962. Turku.

Kari, Lauri Elrikki (1901-1962) and Mäkinen, Yrjö (1931-)

DATES OF PUBLICATION: From Schedae.

Fasc.	Number	
1-2	1-100	1957
3-4	101-200	
5-6	201-300	
7-8	301-400	
9-10	401-500	

11-12	501-600	1962
13-14	601-700	
15-16	701-800	
17-18	801-900	
19-20	901-1000	

Note: Fascicles 1-10 were edited by Kari, numbers 11-20 were edited by Mäkinen. The schedae of the first 10 fascicles was published in Ann. Univ. Turkuensis Ser. A. II. Biologica 23, 1957; the last ten were published in the same journal volume 30, 1962.

UPS, HBG

FUNGI EXSICCATI PRAESERTIM SCANDINAVICI. Cent. 1-2. Numbers 1-200. Jan. 1890-1895. Stockholm.

Romell, Lars (1854-1927)

DATES OF PUBLICATION: From title page.

Cent.	Numbers	Date
1	1-100	Jan 1890
2	101-200	1895

Notes: In Century 2 of the FH copy there is a flyer advertising century 3 for Kronr 15, Mark 17, Shilling 17, Franc 21. There is no record of a third century actually having been published. Only one new species was found--no. 100 *Didymium subcastaneum* Romell with Latin description. Other descriptions and notes are in Bot. Not. 1890.

References: Bot. Kal. 1899. p. 120. TL-2/4: 876.

2FH, BPI, CUP, UPS, S, C (dist.), BM (list), HBG

FUNGI EXSICCATI SUECICI, PRAESERTINI UPSALIENSES. Fasc. 1-56 (in progress). Nos. 1-2800. 1934-1979. Uppsala.

Lundell, Seth (1892-1966), Nannfeldt, Johann Axel Frithiof (1904-)

DATES OF PUBLICATION: From schedae.

SCHEDAE	Numbers	Date
I-II	1-100	1934
III-IV	101-200	1935
V-VI	201-300	1936
VII-VIII	301-400	1936
IX-X	401-500	1937
INDEX		
XI-XII	501-600	1938
XIII-XIV	601-700	1938
XV-XVI	701-800	1939
XVII-XVIII	801-900	1939
XIX-XX	901-1000	1941

INDEX		
XXI-XXII	1001-1100	1941
XXIII-XXIV	1101-1200	1942
XXV-XXVI	1201-1300	1943
XXVII-XXVIII	1301-1400	1946
XXIX-XXX	1401-1500	1947
INDEX		
XXXI-XXXII	1501-1600	1947
XXXIII-XXXIV	1601-1700	1948
XXXV-XXXVI	1701-1800	1949
XXXVII-XXXVIII	1801-1900	1950
XXXIX-XL	1901-2000	1950
INDEX		
XLI-XLII	2001-2100	1953
XLIII-XLIV	2101-2200	1953
XLV-XLVI	2201-2300	1954
XLVII-XLVIII	2301-2400	1956
IL-L	2401-2500	1957
INDEX		
LI-LII	2501-2600	1958
LIII-LIV	2601-2700	1959
LV-LVI	2701-2800	1960
LVII-LX	2801-3000	1979

Note: The set was issued by the Elias Fries Committee. The purpose of the set was to distribute materials collected from the localities visited by Fries. Mr. Seth Lundell, a student of Romell, was responsible for identification of Hymenomycetes. Other groups were identified by Dr. Nannfeldt. Schedae were separately printed. Labels have detailed notes. Some new combinations were made. There are new species described and there are sometimes illustrations. Corrected labels were periodically issued. See TL-2/3:195.

UPS, S, C, PC (dist.) [B partial], BM, V, PR, Leningrad, BPI, DOAM.

FUNGI FENNIAE EXSICCATI. SAMLING AF FINSKA SVAMPAR. Cent. 1-10. Numbers 1-1000. Åbo.

Karsten, Peter Adolf (1834-1917)

DATES OF PUBLICATION: From Title Page

Cent.	Number	
1	1-100	1861
2	101-200	1865
3	201-300	1865
4	301-400	1866
5	401-500	1866
6	501-600	1866
7	601-700	1867
8	701-800	1868
9	801-900	1869
10	901-1000	1870

Notes: New species with Latin descriptions were issued from Century 4 onward.

New species with Latin descriptions are: no. 364. *Phoma excentricum* Karst.; no. 463. *Ascobolus carbonarius* Karst.; no. 507. *Agaricus (Pluteus) sororiatus* Karst.; no. 521. *Hydnum gracilipes* Karst.; no. 529. *Peziza perforata* Karst.; no. 532. *Peziza abundans* Karst.; no. 533. *Peziza radians* Karst.; no. 534. *Peziza impudicella* Karst.; no. 538. *Peziza limosella* Karst.; no. 539. *Peziza lutiseda* Karst.; no. 541. *Peziza echinispora* Karst.; no. 543. *Peziza ovulispora* Karst.; no. 544. *Peziza cortiseda* Karst.; no. 546. *Peziza cilifera* Karst.; no. 547. *Peziza caudata* Karst., no. 548. *Peziza stemmata* Karst.; no. 549. *Peziza sauciella* Karst., no. 552. *Ascobolus myriadeus* Karst.; no. 569. *Sphaerella lycopodina* Karst.; no. 570. *Polysaccum boreale* Karst.; no. 618. *Polyporus euporus* Karst.; no. 619. *Polyporus hians* Karst.; no. 628. *Peziza deformis* Karst.; no. 627. *Peziza virella* Karst.; no. 629. *Ditiola conformis* Karst.; no. 635. *Peziza nobilis* Karst.; no. 637. *Peziza discreta* Karst.; no. 638. *Peziza conscripta* Karst.; no. 642. *Peziza complicata* Karst.; no. 643. *Peziza hydrophila* Karst.; no. 644. *Peziza excelsior* Karst.; no. 645. *Peziza caricinella* Karst.; no. 647. *Peziza microspis* Karst.; no. 648. *Peziza scrupulosa* Karst.; no. 649. *Peziza granulosella* Karst.; no. 650. *Peziza tenebrosa* Karst.; no. 651. *Peziza leucella* Karst.; no. 652. *Peziza euratioides* Karst.; no. 653. *Peziza crispula* Karst.; no. 654. *Peziza xylita* Karst.; no. 655. *Ascobolus polysporus* Karst.; no. 656. *Ditangium insigne* nov. gen. & nov. sp. Karst.; no. 657. *Ascobolus hertellus* Karst.; no. 659. *Ascobolus versicolor* Karst.; no. 661. *Patellaria pithya* Karst.; no. 662. *Peziza acutipila* Karst.; no. 674. *Sphaeria Helvellae* Karst.; no. 703. *Agaricus (Collybia) cessans* Karst.; no. 717. *Cyphella filicina* Karst.; no. 718. *Cyphella abieticola* Karst.; no. 729. *Peziza umbilicata* Karst.; no. 737. *Belonidium litoreum* Karst.; no. 741. *Peziza byssacea* Karst.; no. 742. *Peziza claviliformis* Karst.; no. 743. *Peziza nanella* Karst.; no. 744. *Peziza fallens* Karst.; no. 747. *Peziza graminea* Karst.; no. 751. *Peziza sordidula* Karst.; no. 756. *Tympanis bacillifera* Karst.; no. 760. *Ascobolus cinerellus* Karst.; no. 761. *Peziza fuscella* Karst.; no. 763. *Ascobolus crenulatus* Karst.; no. 765.*Stictis emergens* Karst.; no. 767. *Lophium decipiens* Karst.; no. 768. *Schmitzomia polycocca* Karst.; no. 771. *Lophium laeviusculum* Karst.; no. 773. *Hypoxylon reticulatum* Karst.; no. 774. *Anthostoma fennicum* Karst.; no. 788. *Calosphaeria obvoluta* Karst.; no. 812. *Tremella juniperina* Karst.; no. 816. *Peziza euchroa* Karst.; no. 819. *Peziza sylvatica* Karst.; no. 821. *Helotium procerum* Karst.; no. 823. *Trachila thallophila* Karst.; no. 825. *Sphaeria hirtula* Karst.; no. 827. *Peziza myrtillina* Karst.; no. 830. *Sphaeria perfidiosa* Karst.; no. 833. *Phacidium Epilobii* Karst.; no. 835. *Lachnea callimorpha* Karst.; no. 837. *Helotium Abietis* Karst.; no. 839. *Propolis sorbina* Karst.; 844. *Phacidium macrosporum* Karst.; no. 851. *Trochila diminuens* Karst.; no. 852. *Sphaeria praetermissa* Karst.; no. 853. *Sphaeria emergens* Karst.; no. 854. *Ceratcstoma? depressulum* Karst.; no. 855. *Cucurbitaria pulveracea* Karst.; no. 856. *Calosphaeria? idaeicola* Karst.; no. 857. *Valsa ribesia* Karst.; no. 858. *Hysterographium conjungens* Karst.; no. 859. *Cerastoma subrostratum* Karst.; no. 860. *Anthostoma? microsporum* Karst.; no. 865. *Sphaeria crustacea* Karst.; no. 867. *Gromonia alniella* Karst.; no. 869. *Gromonia Comari* Karst.; no. 871. *Sphaeria salicaria* Karst.; no. 872. *Diaporthe alniella* Karst.; no. 873. *Diaporthe transversalis* Karst.; no. 874. *Sphaeria corylina* Karst.; no. 875. *Sphaeria pygmaea* Karst.; no. 878. *Hypocrea atrata* Karst.; no. 879. *Cucurbitaria rubicola* Karst.; no. 880. *Amphisphaeria supinea* Karst.; no. 881. *Rebentischia* (gen. nov.) *pomiformis* (sp. nov.) Karst.; no. 882. *Pleospora Heleocharidis* Karst.; no. 883. *Sphaeria fennica* Karst.; no. 885. *Lophiostoma crenatum *Viburni* Karst.; no. 886. *Lophiostoma crenatum *Rosae.* Karst.; no. 887. *Lasiosphaeria heterostoma* Karst.; no. 888. *Leptosphaeria Ptamicae* Karst.; no. 890. *Calosphaeria consobrina* Karst.; no. 891. *Sphaeria Holmskjöldi* Karst.; no. 892. *Cucurbitaria Chevalier* Karst.; no. 893. *Amphisphaeria* *pusiola* Karst.; no. 894. *Cucurbitaria pomiformis* Karst.; no. 895. *Sphaerella canescens* Karst.; no. 896. *Leptosphaeria affinis* Karst.; no. 897. *Sphaerella proximella* Karst.; no. 899. *Sphaerella Chamgemori* Karst.; no. 921. *Lachnum hystriculum* Karst.; no. 924. *Peziza laeticolor* Karst.; no. 932. *Schmilzomia elevata* Karst.; no. 950. *Rhynchostoma minutum* nov. gen., nov. sp. Karst.; no. 955. *Ixodopsis fimicola* (Rob.) Karst. [new genus]; no. 961. *Leptosphaeria culmifida* Karst.; no. 963. *Leptosphaeria coccodes* Karst.; no. 964. *Leptosphaeria rustica* Karst.; no. 965. *Sphaerella innumerella* Karst.; no. 966. *Ceratostoma dispersum* Karst.; no. 967. *Rhynchostoma exasperans* Karst.; no. 970. *Lophiostoma duplex* Karst.; no. 971. *Sphaeria lonicerina* Karst.; no. 972. *Sphaeria deflectens* Karst.; no. 982. *Anthostoma foldans* Karst.

References: TL-2/2: 502, Bot. Kal. 1899. p. 119.

FH, ?BPI, UPS, H, BM (list), NY (partial).

FUNGI FIMICOLI EXSICCATI. Fasc. 1-2. Numbers 1-50. 1981-in progress. Uppsala.

Lundquist, Nils (1930-)

DATES OF PUBLICATION: The printed schedae (Publ. Herb. Univ. Uppsala, Sweden 8) is dated Oct. 1, 1981.

Notes: The Exsiccata is issued in ten sets distributed to UPS, C, PRM, ZT, L, K, TRTC, BPI, LPS, TNS.

FUNGI HELVETICI EXSICCATI. Cent. 1-2. Numbers 1-200 and suppl. 1-100. Islebiae.

Winter, Georg (1848-1887)

These numbers were issued as centuries 3-4 (numbers 301-400, 501-600) of Kunze, Fungi Selecti Exsiccati, which see for comments.

Notes: An unnumbered set of specimens bearing this label was also distributed by Winter. These were collections from the early 1870's, examples of which were found in FH.

A separate set "Fungi Helvetici: Supplement" was also issued in the 1880's. It contained 100 numbers. Labels were handwritten and reproduced. Most collections were made by Winter around Zürich (see Bot. Zeitung 38 (52): 903. 1880 (24 Dec).

FH

FUNGI HUNGARICI EXSICCATI. [MAGYARORSZAG GOMBAI] Cent. 1-5. Numbers 1-500. 1882-1886. Ungarisch-Altenburg.

Linhart, György (1844-1925)

DATES OF PUBLICATION: From title page and Reviews and notices

Cent.	Number	Date	Reviews and Notices
1	1-100	1882	Hedwigia 22(2): 22. 1883 (Feb); Bot. Zeitung 41(14): 239. 1883 (6 Apr); *Bot. Centralbl. 4(14): 26-27. 1883.
2	101-200	1883	Hedwigia 22(9): 134. 1883 (Sep); Bot. Zeitung 41(32): 536. 1883 (10 Aug); *Bot. Centralbl. 4(34): 252-253. 1883.
3	201-300	1884	Hedwigia 23(4): 64. 1884 (Apr); Bot. Zeitung. 42(14): 222. 1884 (4 Apr).
4	301-400	1885	Hedwigia 24(3): 125. 1885 (Jun); Bot. Zeitung 43(12): 190. 1885 (20 Mar); *Bot. Centralbl. 6(21): 251-253. 1885 (Jun).
5	401-500	1886	Hedwigia 25(23): 124. 1886 (Jun); Bot. Zeitung 44(18): 326. 1886 (7 Mai);*Bot. Centralbl. 7(17): 119-121. 1886 [with descriptions of new species].

Notes: In the course of its issuance, new species were described by Linhart, Saccardo, Kalchbrenner, Rehm and Niessel. A set of 89 plates illustrating issued fungi were also published. The sometimes extensive descriptions are in several languages.

References: Lindau and Sydow number 15641. Grevillea 14: 136 (Descriptions of those new species issued in Century 5.), Bot. Kal. 1899. p. 119. TL-2/3:65.

FH, BPI, UPS, S, C, HBG (partial)

*specimens listed

FUNGI IMPERFECTI EXSICCATI. Fasc. 1-18. Numbers 1-900. Mar. 1, 1903 - Dec. 31, 1915. Turnau et Tabor, Bohemia.

Kabát, Josef E. Manuel (1849-1925), Bubák, Frantisek (1865-1925)

DATES OF PUBLICATION: Stevenson p. 218-224.

Fasc.	Numbers	Date
1	1-50	Mar 1, 1903
2	51-100	Feb 1, 1904
3	101-150	Sep 1, 1904
4	151-200	Dec 1, 1904
5	201-250	Apr 1, 1905
6	251-300	Dec 1, 1905
7	301-350	Apr 15, 1906
8	351-400	Dec 15, 1906
9	401-450	Apr 15, 1907
10	451-500	Dec 20, 1907
11	501-550	Dec 1, 1908
12	551-600	Dec 20, 1909
13	601-650	Dec 10, 1910
14	651-700	Dec 11, 1911
15	701-750	Dec 10, 1912
16	751-800	Dec 20, 1913
17	801-850	Dec 20, 1914
18	851-900	Dec 31, 1915

References: TL-2/2: 482.

FH, BPI, S (fasc. 1-17, nos. 1-850), HBG

FUNGI LATVICI EXSICCATI. (Latvijas Sēnes). Fasc. 1-19. Numbers 1-950. 1932-1941. Riga.

Smarods, Julius (1884-)

DATES OF PUBLICATION: From Farlow Exsiccati file and schedae

Fasc.	Numbers	Date Indexed at FH	Date from Schedae
1-3	1-150	Mai 1932	10.X.1931, 20.I.1932, 10.II.1932.
4-5	151-250	Jun 1933	15.XII.1932, 1.XII.1932 (with index)
6	251-300	Jun 1933	13.III.1933
7	301-350	Oct 1933	15.IX.1933
8	351-400	Feb 1934	23.XII.1933
9	401-450	Apr 1934	23.II.1934
10	451-500	Dec 12, 1934	25.X.1934 (with index)
11	501-550	Apr 1935	
12	551-600	Jan 1936 [1935]	5.XII.1935
13	601-650	Oct 1936	25.VIII.1936
14	651-700	Mar 8, 1937 [1936]	15.XI.1936
15	701-750	Jan 6, 1938	1.XII.1937 (with index)
16	751-800	Jun 5, 1939	
17	801-850	Mar 1941	1.XI.1939
18	851-900	Mar 1941	25.I.1940
19	901-950	Mar 1941	1.X.1940

Notes: Both A. Kirulis and J. Smarods issued unnumbered sets under the title, "Fungi Latvici."

FH, BPI, UPS (dist.), NY.

FUNGI LONGOBARDIAE EXSICCATI SIVE MYCETUM SPECIMINA IN LONGOBARDIA COLLECTA, ET SPECIEBUS NOVIS VEL CRITICIS, ICONIBUS ILLUSTRATA. Pugillis 1-7, Numbers 1-350. 1892-1914. Ticini and Pavia.

Cavara, Fridiano (1857-1929) and Pollacci, Gino (1872-1963)

DATES OF PUBLICATION: From title page and Hedwigia

Pugillis	Number	Date	
1	1-50	1892	Hedwigia 31: 146. 1892. *Bot. Centralbl. 51(10): 293. 1892 (31 Aug).
2	51-100	1892	Hedwigia 31: 313. 1892. *Bot. Centralbl. 53 (7/8): 234. 1893 (22 Feb).
3	101-150	1892	Hedwigia 32: 424. 1893. *Bot. Centralbl. 57(3): 71. 1894 (10 Jan). INDEXED FH NOV. 1893
4	151-200	1895	Hedwigia 34: (36). 1895. *Bot. Centralbl. 61(9): 316. 1895 (27 Feb).
5	201-250	1895	Hedwigia 35: (125). 1896.
NEW SERIES I			
6	251-300	1914	Hedwigia 54: (188). 1913, 56: (78). 1915. Received FH Jan. 1914.
NEW SERIES II			
7	301-350	1919	Hedwigia 63: (150). 1922. Received FH, Fall 1920.

Notes: Pugillis 1-5 were prepared by Cavara; Pugillis 6 and 7 were edited by Gino Pollacci and were issued from Pavia. Title pages seem to date from a single printing and were hand annotated. Pugillus 5 has an unannotated title page in the FH copy which reads 1892, the date of the first Pugillis. New species were described throughout and many species were illustrated by a well-executed engraving. Descriptions were in Latin.

New species were: no. 40. *Septoria chrysanthemi* Cavara, no. 41. *Glaeosporiella rosaecola* Cavara, no. 49. *Piricularia oryzae* Cavara, no. 64. *Clavaria luteo-ochracea* Cavara, no. 98. *Ascochyta veratin* Cavara, no. 100. *Colletotrichum Agaves* Cavara, no. 109. *Hymenogaster cerebellum* Cavara, no. 110. *Humaria saccardoi* Cavara, no. 140. *Hendersonula macrosperma* Cavara, no. 142. *Septoria laserpitii* Cavara, no. 144. *Ovularia holci-lanati* Cavara, no. 147. *Dactylaria parasitans* Cavara, no. 228. *Chaetomium montemartini* Cavara, no. 231. *Laestadia Traversi* Cavara, no. 240. *Sporotrichum araneorum* Cavara, no. 249. *Glaeosporium inconspicuum* Cavara, no. 286. *Gibberella Briosiana* Turc. & Maff., no. 298. *Macrosporium Sophorae* Turc. & Maff., no. 300. *Tyrostroma Jatrophae* Turc. & Maff.

References: TL-2/1: 474, Bot. Kal. 1899. p. 118.

FH, BPI, S(1-250), BM (list), HBG (1-6)

*Contents listed with descriptions of new taxa.

FUNGI MALAYANA. Cent. 1-6. Numbers 1-600 (plus supplementary specimens). 1916-1920. Los Baños, Philippines.

Baker, Charles Fuller (1872-1927)

DATES OF PUBLICATION: From exsiccatae file FH.

Cent.	Number	
1	1-100	5 Jun 1916 (indexed)
2	101-200	10 Mar 1916 (received)
3	201-300	24 Feb 1917 (indexed)
4	301-400	10 Mai 1918 (received)
5	401-500	19 Mai 1919 (received)
6	501-600	19 Feb 1920 (received)

Notes: New species were described throughout by Sydow, Rehm, Patouillard, Saccardo, Hariot, Diedicke. Indices accompanied specimens and most were mimeographed. New species of Boletes in Cent. 4 were described by Patouillard and Baker (J. Straits Asiat. Soc. no. 78. 1918). Listings of contents were issued with specimens. Descriptions of other species were scattered. Schedae were published separately.

References: Saccardo, P. A. Bull. Orto Botan. Reale Univers. Napoli vi. 31-65. 1918; Sydow, P., Ann. Mycol. 14: 353-375. 1916, 16: 240-248. 1918.

FH (and dist.), BPI (no. 301-599), CUP, S, PC (dist.)

FUNGI NEERLANDICI EXSICCATI. Cent. 1-3. Numbers 1-300. 1875-1879. Amsterdam.

Oudemans, Cornelis Antoon Jan Abraham (1825-1906)

DATES OF PUBLICATION: From title page and Grevillea.

Cent.	Number	Date		
1	1-100	1875	Grevillea 4: 127. 1876	Bot. Zeitung 36(5):77. 1878.
2	101-200	1877	Grevillea 7: 115. 1879	
3	201-300	1879	Grevillea 8: 120. 1880	Bot. Zeitung 38(2):30. 1879. Bot. Centralbl. 1(4/5): 159. 1880.

Notes: Several new species or type collections were issued in this set. Labels have printed titles but handwritten numbers, names, localities, and dates. Indices were issued with specimens.

References: Bot. Kal. 1899. p. 119, TL-2/3: 860.

FH (101-300), BPI (nos. 201-300), UPS (1-100), BM (list).

FUNGI OF FLORIDA. Cent. 1. Numbers 1-88 (incomplete). 1900.

Hume, Hardrada Harold (1875-1965)

References: Stevenson p. 200-201.

FH (dist.), BPI

FUNGI OF SSSR SEE GRIBY SSSR

FUNGI PARASITICI FENNICI SALUTI HOMINIS NUXII EXSICCATI. Numbers 1-12. ca. 1875-80. Mustiaca.

Karsten, Peter Adolf (1834-1917)

Note: According to Teuvo Ahti, Helsinki, the set at H is boxed and has handwritten labels. It is perhaps a unique set.

References: TL-2/2: 502.

FUNGI PARASITICI SCANDINAVICI EXSICCATI. Fasc. 1-10. Numbers 1-500. 1882-1895. Holmiae and Stockholm.

Eriksson, Jakob (1848-1931)

DATES OF PUBLICATION: From title page.

Fasc.	Number		
1	1-50	1882	Hedwigia 21:183. 1882; Bot. Zeitung 40(35):576. 1882. Bot. Zeitung 41(11):190. 1883. (16 Mar).
2	51-100	1883	Hedwigia 22: 157. 1883; Bot. Zeitung 41(43):724. 1883 (26 Oct.)
3	101-150	1883	Hedwigia 22:157. 1883.
4	151-200	1886	Hedwigia 25:216. 1886.
5	201-250	1886	Hedwigia 25:216. 1886; *Bot. Centralbl. 21(5):158-166. 1887.
6	251-300	1888	Hedwigia 28:224. 1889; *Bot. Centralbl. 38(11): 786-787. 1889 (17 Jun).
7	301-350	1891	Hedwigia 31:88. 1892; *Bot. Centralbl. 47(10):296. 1891 (9 Sep).
8	351-400	1891	Hedwigia 31:88. 1892.
9	401-450	1895	*Bot. Centralbl. 64(11):381-383. 1895 (11 Dec).
10	451-500	1895	

Notes: Fascicles 1-3 were published in Holmiae. The following were included on the title pages: F. R. Kjellman, V. Wittrock, C. J. Johanson, N. & G. Lagerheim, E. Ljungström, O. Nordstedt, S. Almquist, K. Häggblom, O. Juel, H. G. Konow, A. Skånberg, J. Brunchorst, G. E. Forsberg, D. Kristofferson, C. Lindman, K. Starkbäck, L. J. Wahlstedt, E. Henning, L. Romell, F. Ulrichsen, G. Widen, N. Wille. New species were described. An index to fasc. 1-10 is in Fasc. 10.

Latin descriptions were provided. Large and ample specimens were issued.

References: TL-2/1:798, Bot. Kal. 1899. p. 119.

FH, BPI (no. 401-450), UPS, S, C, BM (list), HBG

*Contents listed with descriptions

FUNGI POLONICI SELECTI EXSICCATI. Decades 1-2. Numbers 1-20. 1933. Varsavia.

Wróblewski, Anton (-) and Siemaszko, Wincenty (1887-1943)

DATES OF PUBLICATION: From schedae in FH. Decades 1 and 2 were issued together with a one page schedae dated Mar 1933. In this schedae one new species was described (Ustilago Rachiborsikana Siemaszko et Wróblewski). Collections were made by the editors and J. Kochman, W. Konopacka, and T. Wilezyúski.

FH

FUNGI RHENANI EXSICCATI A LEOPOLDO FUCKEL COLLECTI. Fasc. I-XV. Numbers 1-1500, 1863-1865. Supplementi Fasc. I-VI. Numbers 1501-2100. 1865-1867. Tot. Ser. Fasc. VII(XXII) - XII(XXVII). Numbers 2101-2700. 1868-1874.

Fuckel, Leopold [Karl Wilhelm Gottlieb] (1821-1876).

DATES OF PUBLICATION: From title page. Initial announcement Bot. Zeitung 20(49):428. 1862.

Fasc.	Number			
I	1-100	1863	Bot. Zeitung 21(17):143-144. 1863 (24 Apr).	Hedwigia 2(15): 132-136. 1863.
II	101-200	1863	Bot. Zeitung 21(24):191-192. 1863 (12 Jun).	
III	201-300	1863	Bot. Zeitung 21(44):335-336. 1863 (30 Oct).	
IV	301-400	1863	Bot. Zeitung 21(46):355-356. 1863 (13 Nov).	
V	401-500	1863	Bot. Zeitung 22(18):123-124. 1864 (29 Apr).	Hedwigia 3(10): 156-160, (11): 161-165. 1864.
VI	501-600	1863		
VII	601-700	1863		
VIII	701-800	1863		
IX	801-900	1864	Bot. Zeitung 22(37): 280. 1864 (2 Sep).	Hedwigia 5(1): 14, (2):23, (4):50. 1866.
X	901-1000	1864		
XI	1001-1100	1864	Bot. Zeitung 23(41):310-311. 1865 (13 Oct).	
XII	1101-1200	1864		
XIII	1201-1300	1864		
XIV	1301-1400	1864		
XV	1401-1500	1865		
Suppl. Fasc.				
I	1501-1600	1865		
II	1601-1700	1866	Bot. Zeitung 24(26): 199. 1866 (22 Jun).	Hedwigia 6(11): 174-175. 1867; 7(1):12-14. 1868.
III	1701-1800	1866		
IV	1801-1900	1867		
V	1901-2000	1867	*Bot. Zeitung 27(5):79-84. 1869.	
VI	2001-2100	1867	Bot. Zeitung 27(6):96-99. 1869 (5 Feb); 27(7): 119-120. 1869 (12 Feb); 27(10):165-166. 1869 (5 Mar).	
TOT. SER. FASC.				
XXII(VII)	2101-2200	1868		
XXIII (VIII)	2201-2300	1869	Bot. Zeitung 28(42): 679-680. 1870 (21 Oct).	
XXIV (IX)	2301-2400	1871	Bot. Zeitung 29(52):895. 1871 (29 Dec).	
XXV (X)	2401-2500	1872	Bot. Zeitung 31(27): 428-430. 1873 (4 Jul).	
XXVI (XI)	2501-2600	1873		
XXVII(XII)	2601-2700	1874		

Notes: An index to Fascicles 1-15 and Supplement 1 was privately published in 1865. New species were issued with description.

The following taxa described by Fuckel were included in these sets accompanied by Latin descriptions: No. 15. *Peronospora tomentosa* Fckl., no. 21. *P. Lepigoni* Fckl., no. 23. *P. crispula* Fckl., no. 25. *P. conglomerata* Fckl., no. 30. *P. galii* Fckl., no. 31. *P. sherardiae* Fckl., no. 35. *P. valerianellae* Fckl., no. 38. *P. candida* Fckl., no. 39. *P. alta* Fckl., no. 40. *P. Euphorbiae* Fckl., no. 41. *P. alliorum* Fckl., no. 56. *Cylindrium carneum* Fckl., no. 66. *Torula Centaurii* Fckl., no. 73. *Alysidium caesium* Fckl., no. 78. *Sporidesmium Scirpicola* Fckl., no. 92. *Coniothyrium cruciatum* Fckl.

No. 102. *Cryptosporium coronatum* Fckl., no. 103. *Passalora Polythrincicoides* Fckl., no. 116. *Cladosporium punctiforme* Fckl., no. 120. *Cercospora ferruginea* Fckl., no. 130. *Scolictrichum graminis* Fckl., no. 144. *Briarea aurea* Fckl., no. 158. *Acremonium vaccinii* Fckl., no. 168. *Antina aeruginosa* Fckl., no. 174. *Stysanus pusillus* Fckl., no. 173. *Stysanus sphaeriaeformis* Fckl., no. 180. *Sphaeridium flavo-virens* Fckl., no. 195. *Leptostroma cytisi* Fckl., no. 196. *Leptostroma Laricinum* Fckl.

No. 209. *Fusarium violaceum* Fckl., no. 211. *Fusarium sambucinum* Fckl., no. 212. *Fusarium sphaeriae* Fckl., no. 213. *Fusarium minimum* Fckl., no. 219. *Fusidium roseum* Fckl., no. 222. *Fusidium coccineum* Fckl., no. 227. *Cladobotryum(?) gelatinosum* Fckl., no. 282. *Aecidium Scillae* Fckl., no. 287. *Peridium oblongisporium* Fckl., no. 288. *Peridermium pini* Fckl., no. 300. *Melampsora Epilobii* Fckl.

No. 323. *Puccinia Brachypodii* Fckl., no. 349. *Puccinia Millefolii* Fckl., no. 352. *Puccinia Asperulae* Fckl., no. 377. *Puccinia mixta* Fckl., no. 394. *Uromyces Valerianae* Fckl., no. 395. *Uromyces Scrophulariae* Fckl.

No. 401. *Uromyces scillae* Fckl., no. 426. *Stigmatea (Coleroa) Petasitidis* Fckl., no. 427. *Labrella (?) nervisequa* Fckl., no. 455. *Discosia cynosbati* Fckl., no. 458. *Actinonema Populorum* Fckl., no. 469. *Ascospora mali* Fckl., no. 486. *Ascochyta Armoraciae* Fckl., no. 488. *Ascochyta Medicaginis* Fckl., no. 489. *Ascochyta vulnerariae* Fckl., no. 491. *Ascochyta obducens* Fckl., no. 496. *Phyllosticta Anemones* Fckl.

No. 501. *Septoria nigerrima* Fckl., *Septoria potentillarum* Fckl., no. 510. *Septoria Aesculicola* Fckl., no. 511. *Septoria Quercus* Fckl., no. 512. *Septoria pini* Fckl., no. 516. *Septoria villarsiae* Fckl., no. 517. *Septoria Scillae* Fckl., no. 520. *Septoria Daphnes* Fckl., no. 526. *Hendersonia foliicola* Fckl., no. 533. *Diploidia Coryli* Fckl., no. 534. *Diplodia Quercus* Fckl., no. 535. *Diplodia Pseudo-Diplodia* Fckl., no. 542. *Diplodia Ulmi* Fckl., no. 544. *Diplodia Humuli* Fckl., no. 545. *Diplodia caulicola* Fckl., no. 554. *Leptothyrium circinans* Fckl., no. 557. *Chailletia* Fckl., *C. mespili* Fckl., no. 573. *Vermicularia colchici* Fckl., no. 576. *Phoma Dictamni* Fckl., no. 158 [581]. *Phoma Sparganii* Fckl., no. 585. *Hapalocystis Berkeleyi* Awd. mspt., no. 586. *Hapalocystis bicaudata* Fckl., no. 587. *Wuestneia aurea* Awd. mspt., [there are a number of species of *Wuestneia* which are listed as Awd. mspt but which lack descriptions].

No. 622. *Valsa occulta* Fckl., no. 637. *Libertella pallida* Fckl., no. 639. *Podosporium Ribis* Fckl., no. 640. *Ceuthospora subcorticalis* Fckl.

No. 774. *Sphaeronaema flavo-viride* Fckl., no. 775. *Sphaeronaema Hederae* Fckl., no. 782. *Rhaphidospora herpotricha* Awd. mspt. var. *pondiformis* Fckl.

No. 810. *Ceratostoma caulincolum* Fckl., no. 812. *Pleospora Herniariae* Fckl., no. 814. *Pleospora Salsolae* Fckl., no. 815. *Pleospora Evonymi* Fckl., no. 818. *Sphaeria Aethiops* Fckl., no. 821. *S. longissima* Fckl., no. 824. *S. cinerascens* Fckl., no. 834. *S. Systema-solare* Fckl., no. 839. *S. Jurineae* Fckl., no. 843. *S. immunda* Fckl., no. 851. *S. Digitalis* Fckl., no. 870. *S. pruni* Fckl., no. 876. *S. emarginata* Fckl., no. 883. *S. petiolicola* Fckl., no. 887. *S. trifolii* Fckl., no. 895. *S. napi* Fckl., no. 896. *S. Artemisiae* Fckl.

No. 916. *Sphaeria genistae* Fckl., no. 919. *Sphaeria Fuckelii* Duby ined., no. 945. *S. felina* Fckl., no. 952. *S. herpotrichoides* Fckl., no. 954. *S. valsaeformis* Fckl., no. 961. *Coronophora* Fckl., *C. gregaria* Fckl., no. 975. *S. Spiraeae* Fckl., no. 979. *Nectria Sisae* Fckl., no. 990. *N. chartaecola* Fckl., no. 991. *Barya* Fckl., *B. parasitica* Fckl.

No. 1006. *Dothidea Periclymeni* Fckl., no. 1026. *D. Morthieri* Fckl., no. 1030. *D. nivea* Fckl., no. 1032. *D. punctiformis* Fckl., no. 1058. *Hypoxylon equorum* Fckl., no. 1061. *H. globulariforme* Fckl., no. 1099. *Phacidium vincae* Fckl.

No. 1111. *Cryptodiscus Adonis* Fckl., no. 1115. *Trochila aerugenosa* Fckl., no. 1137. *Bulgaria carbonaria* Fckl., no. 1169. *Peziza lichenicola* Fckl., no. 1174. *P. Poae* Fckl.

No. 1212. *Peziza arenosa* Fckl., no. 1224. *P. atrospora* Fckl., no. 1240. *Helvella albipes* Fckl., no. 1274. *Coryne aurea* Fckl.

No. 1371. *Polyporus fusco-lutescens* Fckl.

No. 1444. *Arcyria ferruginea* Fckl., no. 1481. *Sclerotium stellariae* Fckl., no. 1484. *S. elongatum* Fckl.

No. 1508. *Peronospora Schachtii* Fckl., no. 1509. *P. Chrysosplenii* Fckl., no. 1512. *Oidium Valerianellae* Fckl., no. 1513. *Torula (Antennaria) adnata* Fckl., no. 1519. *Cercospora radiata* Fckl., no. 1520. *Cercospora Rhamni* Fckl., no. 1522. *Hadrotrichum* Fckl., *H. Phragmitis* Fckl., no. 1525. *Myriocephalum oblongum* Fckl., no. 1527. *Cryptocoryneum* Fckl., *C. fasciculatum* Fckl., no. 1529. *Epicoccum effusum* Fckl., no. 1532. *Myriothecium ellipsisporium* Fckl., no. 1536. *Stysanus pallescens* Fckl., no. 1537. *Fresenia* Fckl., *F. penicillata* Fckl., no. 1549. *Physoderma Sagittariae* Fckl., no. 1553. *Ascochyta maculans* Fckl., no. 1554. *A. Ebuli* Fckl., no. 1555. *A. Senecionis* Fckl., no. 1557. *Septoria sparsa* Fckl., no. 1558. *Asteroma Alliariae* Fckl., no. 1562. *Stigmatea (Coleroa) subtilis* Fckl., no. 1571. *Psilothecium* Fckl., *P. innumerabile* Fckl., no. 1572. *Chaetomium paucisetum* Fckl., no. 1574. *Sphaeria perpusilla* Fckl., no. 1577. *S. turba* Fckl., no. 1578. *S. graminicola* Fckl., no. 1582. *Nectria Corylii* Fckl., no. 1584. *Coronophora angustata* Fckl., no. 1586. *Endothia sordida* Fckl., no. 1587. *Dothidea petiolicola* Fckl., no. 1591. *Heterosphaeria Poae* Fckl., no. 1593. *Peziza mercuriales* Fckl., no. 1594. *P. medicaginis* Fckl., no. 1596. *P. torulaecola* Fckl., no. 1597. *P. murina* Fckl., no. 1598. *Helotium rhizophilum* Fckl.

No. 1603. *Peronospora Calaminthae* Fckl., no. 1604. *P. Phyteumatis* Fckl., no. 1607. *Synchytrium mercurialis* Fckl., no. 1608. *Chytridium dendriticum* Fckl., no. 1610. *Protomyces Heleocharidis* Fckl., no. 1613. *Gymnosporium* (?) *Fusidii* Fckl., no. 1614. *G. nigrum* Fckl., no. 1616. *Coniothecium charticolum* Fckl., no. 1619. *Speira oblonga* Fckl., no. 1620. *Torula faginea* Fckl., no. 1622. *Torula Salicis* Fckl., no. 1624. *Torula Luzulae* Fckl., no. 1629. *Cladosporium hypophyllum* Fckl., no. 1630. *Cereospora sanguinea* Fckl., no. 1631. *Cercospora Majanthemi* Fckl., no. 1632. *Cercospora Resedae* Fckl., no. 1634. *Ramularia ovata* Fckl., no. 1635. *Ramularia obovata* Fckl., no. 1636. *Ramularia gibba* Fckl., no. 1638. *Verticillium fuscum* Fckl., no. 1645. *Sarcopodium foliicolum* Fckl., no. 1650. *Glaeosporium Betulae* Fckl., no. 1651. *G. Sanguisorbae* Fckl., no. 1652. *G. aterrimum* Fckl., no. 1653. *Fusidium tumescens* Fckl., no. 1656. *Coryneum foliicolum* Fckl., no. 1657. *Coryneum rostratum* Fckl., no. 1658. *Exosporium Rosae* Fckl., no. 1666. *Uromyces acutatus* Fckl., no. 1670. *Puccinia Asteris* Fckl., no. 1673. *Puccinia acuminata* Fckl., no. 1674. *Puccinia circinans* Fckl., no. 1675. *Phragmidium brevipes* Fckl., 1676. *Septoria Cynodontis* Fckl., no. 1677. *Septoria didyma* Fckl., no. 1680. *S. Atriplicis* Fckl., no. 1681. *S. Cydoniae* Fckl., no. 1687. *Asteroma maculare* Fckl., no. 1690. *A. gei* Fckl., no. 1691. *A. radiatum* Fckl., no. 1692. *A. Euphorbiae* Fckl., no. 1694. *Actinonema Rubi* Fckl., no. 1697. *Ascochyta Caricis* Fckl.

No. 1702. *Ascochyta Ranunculi* Fckl., no. 1703. *Stigmatea Alni* Fckl., no. 1705. *Diplodia sparsa* Fckl., no. 1706. *D. Malorum* Fckl., no. 1708. *D. Abrotani* Fckl., no. 1710. *D. Pruni* Fckl., no. 1711. *D. Lycii* Fckl., no. 1712. *D. Aceris* Fckl., no. 1713. *D. cincta* Fckl., no. 1716. *Leptothyrium Coryli* Fckl., no. 1719. *Dothiora Rhamni* Fckl., no. 1721. *Phoma graminicola* Fckl., no. 1722. *P. Syringae* Fckl., no. 1724. *Neottiospora gegaspora* Fckl., no. 1737. *Myxosporium sanguineum* Fckl., no. 1746. *Uncinula Tulasnei* Fckl., no. 1750. *Preussia* Fckl., *P. funiculata* Fckl., no. 1765. *Sphaeronaema rostratum* Fckl., no. 1767. *Pleospora Frangulae* Fckl., no. 1770. *Amphisphaeria epidermidis* Fckl., no. 1772. *Sphaeria caricicola* Fckl., no. 1774. *S. canofaciens* Fckl., no. 1777. *S. monilispora* Fckl., no. 1779. *S. Vaccinii* Fckl., no. 1780. *S. circinata* Fckl., no. 1790. *S. rosae* Fckl., no. 1792. *S. tigrina* Fckl., no. 1791. *S. procumbens*, no. 1793. *S. Alliariae*, no. 1795. *S. immersa* Fckl., no. 1796. *S. herpotrichoides* Fckl., no. 1797. *S. pinetorum* Fckl. no. 1799. *S. Clematidis* Fckl.

No. 1801. *Sphaeria humana* Fckl., no. 1802. *S. equina* Fckl., no. 1806. *Lophiostoma Sedi* Fckl., no. 1807. *L. myriocarpa* Fckl., no. 1809. *L. subcorticalis* Fckl., no. 1811. *Rosellinia abietina* Fckl., no. 1812. *R. subcorticalis* Fckl., no. 1816. *Dothidea Frangulae* Fckl., no. 1829. *Capnodium Lonicerae* Fckl., no. 1836. *Cryptodiscus tinctus* Fckl., no. 1837. *Heterosphaeria Morthieri* Fckl., no. 1838. *Cryptostictis* Fckl., *C. hysterioides* Fckl., no. 1839. *Cenangium populeum* Fckl., no. 1841. *Naevia caricis* Fckl., no. 1844. *Dermatea quercina* Fckl., no. 1845. *D. caespitosa* Fckl., no. 1862. *Calloria* (?) *rubella* Fckl., no. 1863. *Peziza nudipes* Fckl., no. 1867. *P. Sabinae* Fckl., no. 1870. *P. Scirpicola* Fckl., no. 1871. *P. Peltigerae* Fckl., no. 1872. *P. cephaloidea* Fckl., no. 1873. *P. griseo-vitellina* Fckl., no. 1877. *P. Leporum* Fckl., no. 1879. *P. catinoides* Fckl. no. 1881. *Agyrina Galii* Fckl., no. 1886. *Pistillaria maculicola* Fckl., no. 1888. *P. acuminata* Fckl., no. 1891. *Typhula crassipes* Fckl., no. 1892. *Cyphella culmicola* Fckl.

No. 1902. *Peronospora Chrysosplenii* Fckl., no. 1903. *P. Linariae* Fckl., no. 1907. *Torula velutina* Fckl., no. 1908. *T. ramosa* Fckl., no. 1910. *Scolicotrichum bulbigerum* Fckl., no. 1914. *Arthrinium Morthieri* Fckl., no. 1916. *Fusidium granulatum* Fckl., no. 1917. *Coryneum maculicolum* Fckl., no. 1919. *Sphaeridium candidum* Fckl., no. 1920. *Fusisporium Kühnii* Fckl., no. 1921. *Fusarium stercoris* Fckl., no. 1922. *Stysanus Clematidis* Fckl., no. 1923. *Fellneria* Fckl., *F. Grossulariae* Fckl., no. 1925. *Tilletia Calamagrostis* Fckl., no. 1931. *Uromyces acutatus* Fckl., no. 1936. *Ascochyta Pulmonariae* Fckl., no. 1938. *Asteroma Orobi* Fckl., no. 1939. *Sphaeropsis Malvae* Fckl., no. 1941. *Phoma penicillatum* Fckl., no. 1943. *Phoma cortices* Fckl., no. 1944. *Phoma obtusum* Fckl., no. 1945. *Phoma sphaerospermum* Fckl., no. 1946. *Phoma ovispermum* Fckl., no. 1947. *Phoma mixtum* Fckl., no. 1949. *Diplodia Lantanae* Fckl., no. 1951. *D. Lonicerae* Fckl., no. 1952. *D. Evonymi* Fckl., no. 1953. *D. Tiliae* Fckl., no. 1954. *D. scabra* Fckl., no. 1955. *D. Frangulae* Fckl., no. 1956. *D. Dulcamarae* Fckl., no. 1957. *D. Alni* Fckl., no. 1958. *D. Cerasorum* Fckl., no. 1959. *D. Crataegi* Fckl., no. 1960. *Labrella Potentillae* Fckl., no. 1961. *Chaetomium cuniculorum* Fckl., no. 1962. *Chaetomella* Fckl., *C. oblonga* Fckl., no. 1963. *E. petiolicola* Fckl., no. 1965. *Tympanus acicola* Fckl., no. 1988. *Diaporthe alnea* Fckl., no. 1995. *D.* (?) *amygdalinae* Fckl.

No. 2003. *Cryptospora Aesculi* Fckl., no. 2004. *C. populina* Fckl., no. 2005. *Quaternaria Nitschkei* Fckl., no. 2008. *Massaria Ulmi* Fckl., no. 2012. *Ceratostoma pusilium* Fckl., no. 2013. *C. sphaerospermum* Fckl., no. 2016. *Gnomonia Graphis* Fckl., no. 2020. *Sphaeria Epilobii* Fckl., no. 2021. *S. tarda* Fckl., no. 2022. *S. crispata* Fckl., no. 2027. *S. dura* Fckl., no. 2029. *S. peltagerae* Fckl., no. 2032. *Pleospora Senecionis* Fckl., no. 2041. *Chaetosphaeria fusca* Fckl., no. 2044. *Cucurbitaria cinerea* Fckl., no. 2056. *Phyllachora Agrostis* Fckl., no. 2061. *Fumago Tiliae* Fckl., no. 2067. *Propolis Epilobii* Fckl., no. 2068. *Propolis parallela* Fckl., no. 2069. *Cryptomyces Peltigerae* Fckl., no. 2071. *Lachnella Periclymeni* Fckl., no. 2072. *Cenangium vernicosum* Fckl., no. 2073. *Cenangium Radulicolum* Fckl., no. 2074. *Dermatea Laricicola* Fckl., no. 2076. *Peziza hexagona* Fckl., no. 2077. *P. pulchella* Fckl., no. 2078. *P. sordida* Fckl., no. 2082. *Peziza pinetorum* Fckl.

No. 2102. *Peronospora Erodii* Fckl., no. 2108. *Scolicotrichum ochraceum* Fckl., no. 2109. *Sporotrichum* (?) *papyraceum* Fckl., no. 2110. *Fusarium Salices* Fckl., no. 2113. *Aecidium Thymi* Fckl., no. 2121. *Puccinia discolor* Fckl., no. 2124. *Puccinella graminis* Fckl., no. 2125. *Depazea candida* Fckl., no. 2127. *Phoma Scrophulariae* Fckl., no. 2128. *Phoma ellipticum* [nov. nom.] Fckl., no. 2143. *Apiosporium Fumago* Fckl., no. 2144. *Tympanis Syringae* Fckl., no. 2145. *Sphaeronaema Lonicerae* Fckl., no. 2146. *Sphaeronaema diaphanum* Fckl., no. 2147. *Sphaeronaema caespitosum* Fckl., no. 2150. *Excipula stromatica* Fckl., no. 2155. *Leptosphaeria asparagi* Fckl., no. 2156. *Aglaospora juglandina* Fckl., no. 2157. *Massaria stipata* Fckl., no. 2160. *Sphaeria Arcola* Fckl., no. 2161. *S. Dryadis* Fckl., no. 2162. *S. Crataegi* Fckl., no. 2164. *S. Angelicae* Fckl., no. 2165. *S. Fermenti* Fckl., no. 2167. *S. subferruginea* Fckl., no. 2170. *Cucurbitaria Ulmicola* Fckl., no. 2171. *Herpotrichia Rubi* Fckl., no. 2172. *Lasiosphaeria ferruginea* Fckl., no. 2173. *Ohleria* Fckl., *O. modesta* Fckl., no. 2174. *Rosellinia velutina* Fckl., no. 2180. *Propolis Rosae* Fckl., no. 2181. *P. rubella* Fckl., no. 2182. *P. transversalis* Fckl., no. 2183. *Duplicaria* Fckl., *D. Empetri* (Fr.) Fckl., no. 2184. *Hypoderma scirpinum* Fckl., no. 2186. *Peziza Euphrasiae* Fckl., no. 2187. *P. Eryngii* Fckl., no. 2188. *P. asteroma* Fckl., no. 2190. *P. Stipae* Fckl., no. 2191. *P. pulveracea* Fckl., no. 2193. *P. denigrans* Fckl., no. 2194. *P. campanulaeformis* Fckl., no. 2197. *Cyphella nivea* Fckl.

From number 2201 onward, type collections were issued but there are no descriptions. Fuckel states in a footnote that descriptions of taxa are to be found in his "Symbolae mycologicae." Beginning with number 2301, many citations to his work are listed with type collections.

The first 24 fascicles were bound and issued with generally 4 specimens per printed sheet. Sheets were about 8 1/2 x 11 inches. From 25 to the end of the series, specimens were issued on folded loose sheets with printed, glued labels.

The following have descriptions on the labels: no. 2405. *Coryneum Vaccinii* Fckl., no. 2416. *Puccinia Rubiae* Fckl., no. 2420. *Puccinia alpina* Fckl., no. 2424. *Puccinia amphibii* Fckl., no. 2427. *Puccinia Anthoxanthi* Fckl., no. 2432. *Vermicularia Melicae* Fckl., no. 2435. *Sphaerella ferruginia* Fckl., no. 2436. *Sphaeria lacustris* Fckl., no. 2437. *S. Myricariae* Fckl., no. 2439 *Pleospora (Nodulosphaeria) Phyteumatis* Fckl., no. 2450. *Cucurtitula Myricariae* Fckl., no. 2453. *Cryptospora liphaemoides* Fckl., no. 2456. *Valsa sepincola* Fckl., no. 2460. *Diaporthe geographica* Fckl., no. 2463. *Dothidea Hyppophaës* Fckl., no. 2475. *Patellaria Urceolus* Fckl., no. 2476. *Tapesia aurea* Fckl., no. 2481. *Crouania cinnabarina* Fckl., no. 2482. *C. carbonaria* Fckl.

From no. 2501 to 2700 there are "n.sp." indicated, but these are without description.

References: TL-2/1: 896. Bot. Kal. 1899. p. 119.

FH, BPI (1-2697), UPS (dist. in herb. Fries), S, BM (list), HBG (partial)

FUNGI ROSSIAE EXSICCATI. Fasc. 1-7. Numbers 1-350. 1895-1900. St. Petersburg.

Jaczewski, Arthur Louis de (1863-1932), Komarov, Vladimir Leontj Wevic (1869-1945), Tranzschel, Waldemar Andrejevic (1868-1942)

DATES OF PUBLICATION: From title page and Hedwigia.

Fasc.	Number	Date		
1	1-50	1895	Hedwigia Beibl. 34(1):38. 1895 (Jan-Feb).	
2	51-100	1895	Hedwigia Beibl. 34(3):125. 1895 (Jul-Aug).	
3	101-150	1896	Hedwigia Beibl. 35(4/5):126. 1896 (Jul-Oct).	
4	151-200	1898	Hedwigia Beibl. 38(1):53. 1899 (Jan-Feb).	
5	201-250	1898	Hedwigia Beibl. 39(4):111. 1899 (Mai-Jun).	
6	251-300	1899	Hedwigia Beibl. 39(5):191. 1900	*Bot. Centralbl. 84(2) 45-47. 1900 (3 Oct)
7	301-350	1900	Hedwigia Beibl. 39(6):191. 1900	

Note: Fascicules were issued with printed indices. These indices were often hand-corrected. New species are no. 34. *Diaporthe* (*Chorostate*) *Caraganae* Jacz., no. 157. *Uromyces amurensis* Kom., no. 158. *Uromyces amurenses* Kom; no. 163. *Puccinia heucherae* (Schw.) Dietel var. *asiatica* Kom.; no. 176. *Aecidium Caulophylli* Kom.; no. 177. *Aecidium Paloniae* Kom.; no. 210. *Tillcha? Commelinae* Kom.; no. 219. *Puccinia Brachybotrydis* Kom.; no. 225. *Puccinia (Uropyxis) Fraxini* Kom.; no. 260. *Tuburcinia Clintoniae* Kom.; no. 269 a & b.

Puccinia (Rostrupia) Dioscoreae Kom.; no. 273. *Coleosporium Perillae* Kom.; no. 274. *Coleosporium Phellodendri* Kom.; no. 275. *Pucciniastrum Coryli* Kom.; no. 276. *Triphragmium clavellosum* Berk. forma *asiatica* Kom.; no. 278. *Uredinopsis Adianti* Kom.; no. 279. *Pucciniostele Clarkiana*(Tranz. & Kom.); no. 290. *Phyllachora Physocarpi* Jacz.; no. 327. *Pucciniastrum Potentillae* Kom.; no. 328a. *Thecapsora Rubiae* Kom.; no. 334. *Pseudopeziza Komarovii* Jacz.; no. 346. *Melasmia Lonicerae* Jacz.; no. 349. *Didymaria Chelidonii* Jacz.; no. 350. *Cercospora Cladrastides* Jacz.

With Latin descriptions.

References: TL-2/2: 413, Bot. Kal. 1899. p. 119 (fasc. 1-3 only).

FH (and partial dist.), BPI, UPS, S, BM (list), HBG

*specimens listed but without description.

FUNGI ROSSICI EXSICCATI [Gerbarii russkikh gribov]. Ser. A, Fasc. 1-4. Numbers 1-200. Ser. B, Fasc. 11-14. Numbers 501-700. 1915-1918. Riga?

Bucholtz, Fedor Vladimirovic (1872-1924)
Bondartsev [Bondarzew], Apollinaris Semenovich (1877-1968)

Dates of Publication: From FH exsiccatae file.

Ser.	Fasc.	Number	Date
A	1,2	1-100	1915
	3,4	101-200	[1918]
	[5-10	201-500 never issued].	
B	11	501-550	1915
	12	551-600	1916
	13	601-650	1917
	14	651-700	1918

Notes: Series A, fasc. 1 & 2 and Series B, 11 & 12 were edited by Bucholtz, the remainder by Bucholtz and Bondartsev. Bucholtz used the title Fungi Rossici on his personal herbarium in FH. Some of the schedae were published in Izvestya I Trudi volumes 2 and 3.

In a letter to Roland Thaxter at the Farlow Library, dated October 8, 1925 Bucholtz's son, Alex wrote: "As to the Fungi Rossici Exsiccati I have to say that the collection was started in two series A and B, the first one (A) representing the common flora, the second the rare one. My father expected to find 500 species of the more common one so that he started the series B with no. 500 [501] as first number, the Series B of course he expected to continue without set limit. One fascicle of series B always appeared together with a fascicle A, so that 4 pairs of fascicles appeared from 1915-until 1918 (Series A fasc. I-IV #1-200) (Series B. fasc. X-XIV #500-700). This is all that was edited by my father."

FH, BPI, CUP, S.

FUNGI SAXONICI EXSICCATI. DIE PILZE SACHSEN'S. Fasc. 1-50. Number 1-2500. 1885-1918. Koenigstein.

Krieger, Karl Wilhelm (1848-1921).

DATES OF PUBLICATION: From title page and Reviews

Fasc.	Numbers		
1	1-50	1885	Hedwigia Beibl. 24(1):48. 1885 (Jan-Feb), Bot. Zeitung 43(12):190. 1885 (20 Mar).
2	51-100	1885	Hedwigia Beibl. 24(6):265. 1885 (Nov-Dec), Bot. Zeitung 43(44):701. 1885 (30 Oct).
3	101-150	1886	Hedwigia Beibl. 25(2-3):124. 1886 (Mar-Jun).
4	151-200	1886	Hedwigia Beibl. 25(5):216. 1886 (Sep-Oct).
5	201-250	1887	Hedwigia Beibl. 26(2):80. 1887 (Mar-Apr).
6	251-300	1887	
7	301-350	1888	
8	351-400	1888	
9	401-450	1889	
10	451-500	1889	*Hedwigia Beibl. 29(2):130. 1890 (Mar-Apr).
11	501-550	1890	
12	551-600	1890	
13	601-650	1891	
14	651-700	1891	
15	701-750	1892	
16	751-800	1892	
17	801-850	1893	*Hedwigia Beibl. 32(2):99. 1893 (Mar-Apr).
18	851-900	1893	Hedwigia Beibl. 33(1):(30). 1894 (Jan-Feb).
19	901-950	1894	Hedwigia Beibl. 33(3):(98). 1894 (Mai-Jun).
20	951-1000	1894	Hedwigia Beibl. 33(6):(169). 1894 (Nov-Dec).
21	1001-1050	Apr 1895	Hedwigia Beibl. 34(3):(99). 1895 (Mai-Jun).
22	1051-1100	Nov 1895	Hedwigia Beibl. 35(1):(30). 1896 (Jan-Feb).
23	1101-1150	1896	Hedwigia Beibl. 35(3):(92). 1896 (Mai-Jun), Bot. Centralbl. 68(2):41-42. 1896 (8 Jul).
24	1151-1200	Nov 1896	Hedwigia Beibl. 36(1):(31). 1897 (Jan-Feb). Bot. Centralbl. 69(6):170. 1897 (3 Feb).
25	1201-1250	Mai 1897	Hedwigia Beibl. 36(3):(99). 1897 (Mai-Jun), Bot. Centralbl. 70(10):307-308. 1897 (10 Jun).
26	1251-1300	Dec 1897	Hedwigia Beibl. 37(1):(29). 1897 (Jan-Feb), Bot. Centralbl. 74(3):77-78. 1898 (14 Apr).
27	1301-1350	Mai 1898	Hedwigia Beibl. 37(5):(199). 1898 (Sep-Oct), Bot. Centralbl. 75(6/7):188-189. 1898 (10 Aug)
28	1351-1400	1898	Hedwigia Beibl. 38(1):(55). 1899 (Jan-Feb).
29	1401-1450	1899	Bot. Centralbl. 79(5):160-161. 1899 (19 Jul).
30	1451-1500	1899	Hedwigia Beibl. 39(1):(39). 1900 (Jan-Feb), Bot. Centralbl. 81(5):173. 1900 (24 Jan).
31	1501-1550	Jun 1900	Hedwigia Beibl. 39(5):(191). 1900 (Sep-Oct), Bot. Centralbl. 83(4):107-108. 1900 (20 Jun).
32	1551-1600	1900	Hedwigia Beibl. 40(1):(21). 1901 (Jan-Feb.). Bot. Centralbl. 84(5):183-184. 1901 (25 Apr).
33	1601-1650	1901	Hedwigia Beibl. 41(1):(48). 1902 (Jan-Feb).
34	1651-1700	1902	Hedwigia Beibl. 41(3):(140). 1902 (Mai-Jun).
35	1701-1750	1903	Hedwigia Beibl. 42(3):(159). 1903 (Mai).
36	1751-1800	1904	Hedwigia Beibl. 44(2):(86). 1905 (Jan).
37	1801-1850	1904	Hedwigia Beibl. 44(2):(87). 1905 (Jan).
38	1851-1900	1905	Hedwigia Beibl.
39	1901-1950	1906	Hedwigia Beibl. 45(2):(75). 1906 (Jan).
40	1951-2000	1906	
41	2001-2050	1907	Hedwigia Beibl. 47(4):(189). 1908 (Mai).

42	2051-2100	1909	Hedwigia Beibl. 50(1):(48). 1910 (Apr).
43	2101-2150	1911	Hedwigia Beibl. 51(1):(85). 1911 (Jun).
44	2151-2200	1912	Hedwigia Beibl. 52(1):(153). 1912 (Mar).
45	2201-2250	1913	Hedwigia Beibl. 54(1):(59). 1913 (Sep).
46	2251-2300	1914	Hedwigia Beibl. 55(2):(151). 1914 (Sep).
47	2301-2350	1915	
48	2351-2400	1916	
49	2401-2450	1918	
50	2451-2500	1919	

Notes: Indices were issued with specimens. There are numerous new combinations in this set. Weigel (Herbarium 4:28. 1908) offered a second Auflage. Many specimens were also issued in Rehm's Ascomyceten.

New species were described by Bresadola, Hennings, Rehm, von Höhnel. Many of them in Annales Mycologici and Hedwigia. Others seem to date from this set and are provided with German descriptions.

References: TL-2/2:674, Bot. Kal. 1899. p. 119.

FH, BPI, CUP, S, BM (list), HBG.

*some specimens listed

FUNGI SELECTI EXSICCATI. Series 1-39. Numbers 1-959 (plus supplementary numbers). 1903-1925. Hamburg.

Jaap, Otto (1864-1922)
Brick, Carl (1863-1924)

DATES OF PUBLICATION: From title pages and Hedwigia.

Series	Number		
1	1-25	Mar 1903	Hedwigia 42(3):(158). 1903 (Mai).
2	26-50	Oct 1903	Hedwigia 42(6):(347). 1903 (Dec).
3	51-75	Mai 1904	Hedwigia 43(3):(122). 1904 (Jul).
4	76-100	Oct 1904	Hedwigia 44(2):(86). 1905 (Jan).
5	101-125	Mai 1905	Hedwigia 44(3):(175). 1901 (Apr).
6	126-150	Nov 1905	
7	151-175	Mar 1906	
8	176-200	Nov 1906	
9	201-225		
10	226-250	Apr 1907	
11,12	251-300	Jan 1908	Hedwigia 49(1):(50). 1909 (Jul).
13,14	301-350	Dec 1908	Hedwigia 49(1):(50). 1909 (Jul).
15,16	351-400	Nov 1909	Hedwigia 50(2):(87). 1910 (Jul).
17,18	401-450	Sep 1910	Hedwigia 51(1):(84). 1911 (Jun).
19,20	451-500	Feb 1911	Hedwigia 51(2):(168). 1911 (Aug).
21,22	501-550	Nov 1911	Hedwigia 52(1):(81). 1912 (Mar).
23,24	551-600	Sep 1912	Hedwigia 53(2):(168). 1913 (Feb).
25,26	601-650	Jul 1913	Hedwigia 54(2):(124). 1913 (Nov).
27	651-675	Jan 1914	Hedwigia 55(1):(70). 1914 (Mai).
28	676-700	Sep 1914	Hedwigia 56(1):(78). 1915 (Feb).
29,30	701-750	Mai 1915	Hedwigia 57(1):(75). 1916 (Sep).
31,32	751-800	Aug 1916	Hedwigia 59(2):(139). 1917 (Jul).
33,34	801-850	Nov 1917	Hedwigia 60(2):(177). 1918 (Nov).
35	851-875	Mai 1923	Hedwigia 62(2):(146). 1921 (Apr).
36	876-900	Dec 1924	Hedwigia 65(3):(194). 1924 (Aug).
37	901-925	Mai 1925	Hedwigia 65(3):(194). 1924 (Aug).

38	926-950	Nov 1925	Hedwigia 66(2):(118). 1925 (Jun).
39	951a-959	Dec 1928	Hedwigia 66(2):(118). 1925 (Jun).

Notes: Numbers 1-875 were prepared by Jaap. Remaining numbers were issued by Brick. Besides Jaap, new species were described by Rehm, Lindau, Hennings, Bresadola, Magnus and Diedel. Each "series" is accompanied by an index of included species. New species were published as noted below. Descriptions were not included with the specimens. A number of new combinations were made.

Under the title "Verzeichnis zu meinen Exsiccatenwerk, Fungi selecti exsiccati" lists and description were published in Abh. Bot. Vereins der Provinz Brandenburg 47:77-99. 1905 (nos. 1-100); 49:7-29. 1907 (nos. 101-200); 50:29-51. 1908 (nos. 201-300); 52:6-19. 1910 (301-400); 54:17-31. 1912 (400-500); 56:27-92. 1914 (nos. 501-600); 57:8-25. 1915 (601-700); 59:24-40. 1918 (nos. 701-800).

References: Lindau and Sydow numbers 12890, 12893, 34871,34872a, 41288.
TL-2/2:393.

FH, BPI, CUP, S, HBG

FUNGI SELECTI EXSICCATI. Cent. 1-6 [5 not published], 1-400, 501-600. Appendix no. 1-8. 1876-1880. Eisleben.

Kunze, Johannes (-1881) and
Winter, Georg (1848-1887)

DATES OF PUBLICATION: From title pages & reviews; first noted Bot. Zeit. 34(33):309. 1876.

Cent.	Numbers		
1(I-II)	1-100	1876	Bot. Zeitung 35(36):567. 1877.
2(III-IV)	101-200	1877	Bot. Zeitung 35(36):567. 1877.
3	301-400	1880	Bot. Zeitung 38(10):175-1880; *Bot. Centralbl. 1(20):639-640. 1880. sub no. 201-300.
[4]	[401-500]		[not published]
5	501-600		*Bot. Centralbl. 1(21/22):685-686. 1880.
Appendix 1	1-8		Indexed FH 29.III.1898

Issued in fascicles of 50 at 7M 50 Pf per fasc.

Notes: Issued in fascicles of 50 at 7M 50 Pf per fasc. Under Winter's editorship, the title "Fungi Helvetici Exsiccati" was used. Number 301 = Number 1 of Fungi Helvetici. Numbers 401-500 in the Fungi Selecti Exsiccati were apparently never issued. The following summarizes the numbering between these titles.

Fungi Selecti		Fungi Helvetici
301 - 400	=	1 - 100
501 - 600	=	101 - 200

Some names were listed as new species but were without description.

A series was also issued "Fungi Helvetici: Supplement" which was apparently not part of this series.

References: TL-2/2:705, Bot. Kal. 1899. p. 119.

FH (partial set dist.), BPI, UPS, S, C (dist.), BM (list), HBG (partial)

*specimens listed

FUNGI SELECTI EXSICCATI. Cent. 1-3. Numbers 1-300. 1910-1914. Lisbon.

Torrend, Camille [Camillo] (1875-1961)

DATES OF PUBLICATION: FH accession lists, Hedwigia, Herbarium, and Broteria.

Cent.	Ser.	Number	
1	1-4	1-100	Rec'd Oct 1910. FH, Herbarium 1(16):125. 1910.
2	5-8	101-200	Hedwigia 54(2):(125). 1913 (Nov); 54(3):(188). 1914. (Feb); Broteria, Ser. Bot. 11:99-104. 1913; Herbarium 1(31):292. 1913.
3	9-12	201-300	Broteria, Ser. Bot. 12:53-71. 1914. Herbarium 1(38):354. 1915.

Notes: Various titles were used in the first century: Mycotheca Lusitanica, Mycotheca Oceanica, Mycotheca Africana. Stevenson notes that there was specimen substitution in the series. New species were described in the Broteria articles listed above.

References: Stevenson p. 466-469.

FH, S.

FUNGI SELECTI EXSICCATI EUROPAEI. Lief. 1-4. Numbers 1-200. 1932-1933. Wien.

Litschauer, Viktor (1879-1939)
Lohwag, Heinrich (1884-1945)

DATES OF PUBLICATION: From Hedwigia.

Lief	Number	Date	
1	1-50		
2	51-100	1932	Hedwigia Beibl. 74(1):(138). 1934 (10 Aug).
3	101-150	1933	Hedwigia Beibl. 74(1):(138). 1934 (10 Aug).
4	151-200	1931	

Notes: The last lieferung listed here appeared in Hedwigia under the title *Fungi Tirolenses Exsiccati* but this title is not found on any of the labels in UPS. This I have assumed to be a part of the present series. In the UPS series, there are no title pages and only a typescript listing contents.

References: TL-2/3: 121.

UPS

FUNGI SELECTI GALLICI EXSICCATI. Cent. 1-74. Numbers 1-7400. 1879-1898. Toulouse.

Roumeguère, Casimir (1828-1892)
Fautrey, François (1833-1905)

DATES OF PUBLICATION: See Stevenson p. 347-367.

Century	Number	Date	
1	1-100	1879	Bot. Zeitung 37 (18):295. 1879.
2	101-200	1879	
3	201-300	1879	
4	301-400	1879	
5	401-500	1879	Bot. Zeitung 37(38):614. 1879.
6	501-600	1879	Bot. Zeitung 37(48):774. 1879.
7	601-700	1880	*Bot. Centralbl. 1(6):189-191. 1880.
8	701-800	1880	
9	801-900	1880	Bot. Zeitung 38(49):831. 1880.
10	901-1000	1880	
11	1001-1100	1881	Bot. Zeitung 39(12):197. 1881.
12	1101-1200	1881	
13	1201-1300	1881	Bot. Zeitung 39(24):391. 1881. Bot. Centralbl. 2(23):362. 1881.
14	1301-1400	1881	
15	1401-1500	1881	
16	1501-1600	1881	Bot. Zeitung 39(43):708. 1881. Bot. Zeitung 40(9):159. 1882.
17	1601-1700	1881	
18	1701-1800	1881	
19	1801-1900	1882	Bot. Zeitung 40(15):254. 1882.
20	1901-2000	1882	
21	2001-2100	1882	Bot. Zeitung 40(19):318. 1882.
22	2101-2200	1882	Bot. Zeitung 40(33):561. 1882.
23	2201-2300	1882	
24	2301-2400	1883	
25	2401-2500	1883	
26	2501-2600	1883	Bot. Zeitung 41(42):711. 1883.
27	2601-2700	1883	
28	2701-2800	1884	
29	2801-2900	1884	
30	2901-3000	1884	
31	3001-3100	1884	Bot. Zeitung 42(52):844. 1884.
32	3101-3200	1885	Bot. Centralbl. 6(6):185. 1885.
33	3201-3300	1885	
34	3301-3400	1885	
35	3401-3500	1885	
36	3501-3600	1886	
37	3601-3700	1886	
38	3701-3800	1886	
39	3801-3900	1886	
40	3901-4000	1887	
41	4001-4100	1887	
42	4101-4200	1887	
43	4201-4300	1887	
44	4301-4400	1888	
45	4401-4500	1888	
46	4501-4600	1888	
47	4601-4700	1888	Bot. Centralbl. 9(44):160. 1888.
48	4701-4800	1889	Bot. Centralbl. 10(3):95. 1889.
49	4801-4900	1889	
50	4901-5000	1889	

51	5001-5100	1889	
52	5101-5200	1890	Bot. Centralbl. 41(6):171. 1890.
53	5201-5300	1890	Bot. Centralbl. 42(7):238. 1890.
54	5301-5400	1890	Bot. Centralbl. 43(4):104. 1890.
55	5401-5500	1890	
56	5501-5600	1891	
57	5601-5700	1891	Bot. Centralbl. 46(6):193. 1891 (6 Mai).
58	5701-5800	1891	
59	5801-5900	1891	
60	5901-6000	1892	Bot. Centralbl. 49(3):75. 1892 (26 Jan).
61	6001-6100	1892	
62	6101-6200	1892	Bot. Centralbl. 52(12):396. 1892 (15 Dec).
63	6201-6300	1893	*Bot. Centralbl. 53(5):144. 1893 (25 Jan). *Bot. Centralbl. 54(1):8. 1893 (29 Mai).
64	6301-6400	1893	Bot. Centralbl. 55(8):237. 1893 (16 Aug).
65	6401-6500	1894	*Bot. Centralbl. 57(7):199. 1894 (7 Feb). *Bot. Centralbl. 58(5):156. 1894 (25 Apr).
66	6501-6600	1894	*Bot. Centralbl. 59(12):365. 1894 (4 Sep).
67	6601-6700	1894	*Bot. Centralbl. 60(10):297. 1894 (20 Nov).
68	6701-6800	1895	*Bot. Centralbl. 63(4/5):107-108. 1895 (26 Jul).
69	6801-6900	1895	*Bot. Centralbl. 64(9):302. 1895 (27 Nov).
70	6901-7000	1896	*Bot. Centralbl. 68(2):42. 1896 (8 Jul).
71	7001-7100	1896	Bot. Centralbl. 68(9):285. 1896 (24 Nov).
72	7101-7200	1897	Bot. Centralbl. 72(7):233. 1897 (10 Nov). Bot. Centralbl. 73(9):302. 1898 (23 Feb).
73	7201-7300	1897	
74	7301-7400	1898	Bot. Centralbl. 76(11):370. 1898 (30 Nov).

Notes: Specimens were also occasionally labeled: *Fungi Selecti Exsiccati*, *Fungi Selecti Gallici*. Stevenson discusses the irregularities of labeling and title. Fantrey edited the series from Century 62 onward. See TL-2/4:934.

FH, BPI, CUP, UPS, S, PC (several sets), HBG (partial)

*specimens listed at least in part.

FUNGI SELECTI GUATEMALENSES EXSICCATI. Decade 1-2, Numbers 1-20. 1906-1907. Columbus, Ohio.

Kellerman, William Ashbrook (1850-1908).

DATES OF PUBLICATION: See Stevenson p. 230-231.

Decade	Number	Date
1	1-10	1906
2	11-20	1907

References: Lindau and Sydow numbers 13778, 35316, TL-2/2:517.

FH, CUP

FUNGI TIROLENSES EXSICCATI. SEE FUNGI SELECTI EXSICCATI EUROPEAI.

FUNGI UTAHENSIS. Fasc. 1-9. Numbers 1-225. Dec. 1904-Nov. 1914. Salt Lake City, Utah.

Garrett, Albert Osbun (1870-1948)

DATES OF PUBLICATION: Stevenson p. 169-172.

Fasc.	Number	Date	
1	1-25	Dec 1904	
2	26-50	Dec 1905 (?)	Received Feb. 1906 at FH
3-4	51-100	Jul 10, 1906	
5	101-125	Jan 19, 1907	
6	126-150	Mar 1908	
7	151-175	Apr 1909	
8	176-200	Sep 1910	
9	201-225	Nov 1914	
10	226-250	Dec 26, 1918	

Note: Ex herbarium specimens of A. O. Garrett are in FH. All the specimens issued were Uredinales. Initially original descriptions were published. This was discontinued after fascicle two. The set sold at $2 per fascicle.

References: Stevenson p. 169-172, Lindau and Sydow number 9699, TL-2/1:918.

FH (partial set dist.), S, HBG (1-9).

FUNGORUM EXOTICORUM DECADES. Decades 1-5. Numbers 1-50. 1879-1882 (?) Klosterneuburg, Austria.

Thumen, Felix Karl Albert Ernst de (1839-1892)

DATES OF PUBLICATION: Stevenson p. 464-465.

Decade	Numbers	Date
1	1-10	1879
2	11-20	1880
3	21-30	1881
4	31-40	1882
5	41-50	1882

Notes: UPS copy has title page for decade 2 dated 1879 but this is a hand correction of an 1880 title page. Specimens are from Siberia, India, Egypt and Argentina.

References: Grevillea 7: 152. 1879. Stevenson p. 464-465, Bot. Kal. 1899, p. 120.

UPS (21-40)

FUNGUS DISEASES OF CULTIVATED AND WILD PLANTS.
SEE GRIBNYA BOLEZNI CULTURNIKH I DIKORASTUYUSHIKH POLEZNIKH RASTENII.

GRAMINICOLOUS SMUTS OF NORTH AMERICA. Cent. 1-3. Numbers 1-300. Mar. 1948-Feb. 1953. Pullman, Washington.

Fischer, George William (1906-)

DATES OF PUBLICATION: Stevenson p. 166-168.

Century	Numbers	Date
1	1-100	Mar 1948
2	101-200	Apr 1949
3	201-300	Feb 1953

References: Stevenson p. 166-168, TL-2/1:837.

FH, BPI, UPS (dist.), NY

GRIBNYA BOLEZNI CULTURNIKH I DIKORASTUYUSHIKH POLEZNIKH RASTENII [FUNGUS DISEASES OF CULTIVATED AND WILD PLANTS] Numbers 1-50 (many missing).

Bucholtz, Fedor Vladimirovic (1872-1924)

DATES OF PUBLICATION:

Notes: The set contains specimens mounted on single folded sheets with illustrations of microscopic details. On the facing sides are lengthy descriptions in Russian. The numbers at FH are from the Bucholtz Herbarium purchased by the Farlow Herbarium in 1930. It is annotated.

FH [nos. 6, 11, 14-16, 18-22, 25-28, 33, 34, 41, 43, 44, 47]

GRIBY ROSSII HERBARII. PARAZITI CULTURNIKH RASTENII. [Herbarium of fungi. Parasites of Cultivated Plants]. Fasc. (?) 1-7. Numbers 1-250. 1909-1926.

Nevodovskii, G. (-1952)

DATES OF PUBLICATION: From FH copies.

Fasc.	Numbers	Date
1	1-50	1909
2	51-100	1909
3	101-150	1915

4	151-200	1917	
5	201-250	1917	
6-7	251-350	1926	Hedwigia 67(1): (90). 1927 (Mai).

Notes: The series was edited by Nevodovskii; confirmations were by Tranzschel. Descriptions and comments are in Russian.

FH (1-250).

GRIBY SSSR. [FUNGI OF S.S.S.R.]. Fasc. 1-7. Numbers 1-175. [1954]-1961.

Nevodovskii, G.(-1952) and
Zhukovoi, C. P. (-).

DATES OF PUBLICATION: From binders.

Fasc.	Numbers	Date
1	1-25	
2	26-50	1954
3	51-75	1954
4	76-100	1955
5	101-125	1957
6	126-150	1958
7	151-175	1961

Notes: Fascicles 1-3 were issued by Nevodovskii; the remainder by Zhukovoi. Labels are completely printed with illustrations of many of the specimens.

FH (26-175), BPI (1-125), UPS (1-175).

HERBAR POSENER PILZE. Lief. 1. Number 1-100. 1911. Leipzig.

Szulezewski, A. (-)

DATES OF PUBLICATION: from Hedwigia

Lief.	Numbers	Date	
1	1-100	1911	Hedwigia 52(1): (81). 1912 (Mar).

Note: This set was advertised by Weigel (Herbarium 22: 182. 1911) for 10 M. I have not seen it.

HERBARIUM CRYPT. IND. ORIENT. "Series" 1 (Uredinales). Fasc. 1-3. Numbers 1-150. 1953-1957. "Series" 2 (Ustilaginales). Fasc. 1. Numbers 1-50. 1954. "Series" 3 (Cercosporae). Fasc. 1. Numbers 1-50. 1955. New Delhi.

Vasudeva, Raghu Nath Sahai (1905-)

DATES OF PUBLICATION: From title pages.

"Series"	Fasc.		
1 (Uredinales)	1	1-50	1953
	2	51-100	1954
	3	101-150	1957

2 (Ustilaginales)	1	1-50	1954
3 (Cercosporae)	1	1-50	1955

Notes: In the introduction it is stated that an attempt would be made to issue types and "co-types."

FH, BPI, NY

HERBARIUM CRYPTOGAMICUM ROSSICUM, SECTIO QUARTO: FUNGI. Fasc. 1. Number 1-50. 1876. St. Petersburg.

Sredinsky [Sredinski], Nicolai C. (1843-1908)

Notes: I have not seen this set. It is noted, as listed above, by Urban (p. 282).

HERBARIUM MYCOLOGICUM OECONOMICUM. Fasc. 1-15. Numbers 1-750. 1872-1880. Teplitz, Bayreuth, Klosterneuburg, Vienna.

Thümen, Felix Karl Albert Ernst Joachim de (1839-1892)

DATES OF PUBLICATION: Stevenson p. 460-463.

Fasc.	Numbers	Date		
1	1-50	1872	Grevillea 1(9):142. 1873.	Just's Bot. Jahresber. 1:47. 1873.
2	51-100	1872	Grevillea 2(15):47. 1873.	
3	101-150	1873		
4	151-200, 175b	1874	Just's Bot. Jahresber. 2:210. 1874 [1876].	
5	201-250, 237b	1874	Just's Bot. Jahresber. 3:168. 1875 [1877].	
6	251-300	1874		
7	301-350	1875		
8	351-400	1875	Just's Bot. Jahresber. 4:110. 1876 [1878].	
9	401-450	1876		
10	451-500	1877	Just's Bot. Jahresber. 5:79. 1877 [1879].	
11	501-550	1877		
12	551-600	1878		
13	601-650	1878		
14	651-700	1879		
15	701-750	1880	Bot. Centralbl. 2(4):128. 1881 (notice only).	

Notes: Fascicles 1-3 were published in Teplitz, Germany; 4-8 Bayreuth, Bavaria; 9-13 Klosterneuburg, Austria; 14-15 Vienna, Austria.

References: Lindau and Sydow number 26623, Bot. Kal. 1899. p. 120.

BPI (no. 296-749), UPS, S.

HERBARIUM MYCOLOGICUM ROMANICUM. Fasc. 1-50. Numbers 1-2500. 1928-1978. Bucharest [in progress].

Săvulescu, Traian (1889-1963), Bontea, Vera (1911-), Constantinescu, Ovidiu (1933-), and Negrean, Gavril (1932-).

DATES OF PUBLICATION: From Schedae, FH accession lists, and title pages.

Fasc.	Number	Date	
1	1-50	1928	Feb. 3, 1930 (indexed)
2	51-100	1928	Feb. 3, 1930 (indexed)
3	101-151	1930	
4	151-200	1930	
5	201-250	1931	
6	251-300	1931	
7	301-350	1932	
8	351-400	1932	
9	401-450	1932	
10	451-500	1932	
11	501-550	1934 t.p.	
12	551-600	1934 t.p.	
13	601-650	1934 t.p.	
14	651-700	1934 t.p.	
15	701-750	1939	
16	751-800	1939	
17	801-850	1939	
18	851-900	1939	
19	901-950	1939	
20	951-1000	1939	
21	1001-1050	1939	
22	1051-1100	1939	
23	1101-1150	1939	
24	1151-1200	1939	
25	1201-1250	1940	
26	1251-1300	1947	Dec 1948 (indexed FH)
27	1301-1350	1947	Dec 1948 (indexed FH)
28	1351-1400	1947 t.p.	
29	1401-1450	1950	
30	1451-1500	1950	
31	1501-1550	1955	
32	1551-1600	1955	
33	1601-1650	1959	rec'd FH 1960
34	1651-1700	1962	
35	1701-1750	1963	
36	1751-1800	1967	
37	1801-1850	1967	
38	1851-1900	1972	
39	1901-1950	1972	
40	1951-2000	1972	
41	2001-2050	1972	
42-45	2051-2250	1974	
46-50	2251-2500	1975	
51-55	2501-2750	1978	Oct

Notes: An index for fascicles 1-30, 1929-1950 was published in 1951. Schedae for numbers 1-950 were published together in 1968. Schedae for numbers 951-1750 and an index were also published in 1968. Fascicles 1-35 were edited by Traian Savulescu, 36-37 were edited by Vera Bontea and O. Constantinescu and 38-50 by O. Constantinescu and G. Negrean. There were many collaborators.

New species were described such as no. 445. *Macrosporium Vaccariae* Savul. & Sandu. Latin descriptions accompany specimens. There are many corrections and annotations.

Schedae for 46-50 (no. 2251-2500) were published in 1975 and for 51-55 in 1978. Twenty-one collections of *Peronospora parasitica* in fascicle 54 and 13 collections of *Albugo candida* in fascicle 53 make this set a study in monotony.

FH (partial set dist.), BPI, CUP, UPS (501-1200, 1250-2500), S, C, PC (dist. except fascicles 46-50, no. 2251-2500).

HERBARIUM MYCOLOGICUM TYPICUM [TYPENSAMMLUNG VON PILZEN]. Nos. 1-201 & 37 add.; no. 172 lacking.

Bail, Theodor (1833-1922)

Note: This is known only as a title listed in Flora 41: 792. 1858. TL-2/1:91 states that 20 sets were issued but only known at IB.

HERBARIUM NORDDEUTSCHE PFLANZEN FÜR ANGEHENDE LEHRER. PHARMACEUTEN UND ALLE FREUNDE DER BOTANIK. Fascicles I-VIII, 346 numbers. Driessen und Gorlitz. 1860. Ed. 2, by Baenitz. Gorlitz, 1863.

Lasch, Wilhelm Gottfried (1786-1863)
Baenitz, Karl Gabriel (1837-1913)

Notes: 30 Fungi made up fascicle 5. I have not seen this set.

References: Lindau and Sydow number 14945; Sayre p. 32, TL-2/2: 762, Bot. Kal. 1899. p. 116.

HERBARIUM NORMALE. NOV. SER. HERBIER DES PLANTES NOUVELLES PUE CONNUES ET RARE D'EUROPE PRINCIPALEMENT DE FRANCE ET D'ALLEMAGNE PUBLIE PAR F. SCHULTZ.

Schultz-Bipontinus, Friedrich Wilhelm (1804-1876).

DATES OF PUBLICATION: Sayre p. 47.

Cent.	Number	Date
1-2	1-200	15 Aug 1856
3-4	201-400	Dec 1858
5-6	401-600	Apr 1861
7-8	601-800	Mar 1864
9-10	801-1000	Jun 1866
11-12	1001-1200	Mai 1869

Notes: A set, which included fungi, was given to FH in 1911 by GH. This set was inserted in the general collection. Sayre states that cryptogams are found only in Century 2,4,6,8,10 and 12.

References: Lindau and Sydow number 24358, Sayre p. 46.

FH (dist.)

HERBARIUM OF FUNGI. PARASITES OF CULTIVATED PLANTS.

SEE GRIBY ROSSII HERBARII. PARAZITI CULTURNIKH RASTENII.

HERBARIUM PATHOLOGICUM. Lief. 1-8. Numbers 1-200. 1916-1921.

Weiss, Johann Evangelist (1850-1918)

DATES OF PUBLICATION: From Hedwigia reviews.

Lief.	Numbers	Date	
1,2	1-50	1916	Hedwigia Beibl. 59(1):(62). 1918 (Mar).
3,4	51-100	1917	Hedwigia Beibl. 60(2):(177). 1919 (Nov). Herbarium 1(44):420. 1918, 1(46):437. 1918.
5	101-125	1921	Hedwigia Beibl. 62(2):(146). 1921 (Apr); Herbarium 2(51):3. 1920.
6,7	126-175	1921	Hedwigia Beibl. 63(1):(96). 1922 (Dec).
8	176-200	1921	Hedwigia Beibl. 63(2):(150). 1922 (Aug). Hedwigia Beibl. 64(1):(68). 1923 (Mar).

Note: Three other sets assembled by Weiss were noted in Herbarium 1:437. 1918. I have no other information on these titles which follow: Herbarium Pathologicum der Landwirtschaftlichen Kulturgewächse und der Gemüsepflanzen; Herbarium Pathologicum der Obstgehölze und Beerensträucher; Herbarium Pathologicum der Zierpflanzen, Park- und Alleebäume. In Herbarium 1:448. 1919. The first Lieferung of each of these is listed, each as being published in 1918, and each containing numbers 1-25. Wiegel (Herbarium 2:3. 1920) noted that fascicle 5 was continued by R. Staritz.

FH?, S (I-VII, nos. 1-150. 1916-1920).

HERBARIUM PHYTOPATHOLOGICUM HERAUSGEGEBEN VON DER STATION FÜR PFLANZENSCHUTZ AN DER DEUTSCH. Landwirtschaftlichen Hochschule in Tetschen-Liebwerd. Lief. 1-4. Numbers 1-100. 1923.

DATES OF PUBLICATION: From reviews and title pages.

Lief.	Numbers	
1	1-25	Herbarium 2(64):161. 1923.
2	26-50	Herbarium 2(66):173. 1923. Rec'd FH Jan 1924.
3	51-75	Oct. 1923 (title page), Herbarium 2(67):192. 1924.
4	76-100	Jan 1924 (title page), Herbarium 2(67):192. 1924.

Note: The set includes some insects. Many of the collections were made by F. Zimmermann.

FH

HERBARIUM SCHLESISCHER PILZE. Fasc. 1-19. Numbers 1-950. 1865-1887. Breslau.

Schneider, Wilhelm Gottlieb (1814-1889).

DATES OF PUBLICATION: From Lindau and Sydow 24073.

Fasc.	Numbers	Date	
1	1-50	1865	title page - Bot. Zeit. 23(52):399-400. 1865. with description of project
2	51-100	1865	title page
3	101-150	1870	
4	151-200	1870	
5	201-250	1874	
6	251-300	1878	
7	301-350	1879	
8	351-400		
9	401-450	1880	
10	451-500		
11	501-550	1880	
12	551-600	1881	
13	601-650	1882	
14	651-700	1882	
15	701-750	1883	
16	751-800	1884	
17	801-850	1885	
18-19	851-900 901-950	1887	

Notes: In the only two fascicles seen, there were published lists. Most specimens are of plant-pathogens.

Reference: Bot. Kal. 1899. p. 120.

FH (1 and 2 only)

HERBARIUM VAN NEDERLANDSCHE PLANTEN. HERBARIUM NEDERLANDSCHE PLANTEN DOOR. C.A.J.A. Oudemans. Fasc. 1-27. Numbers 1-1350. 1867-?

Oudemans, Cornelius Antoon Jan Abraham (1825-1906)

Notes: A number of fungi were included in this set. I have not seen specimens. Sayre states that 12 copies were presented to various Dutch institutions. The contents of the first 12 fascicles are listed in Nederl. Kruidk. Arch. II. 1:50-97, 1871 among which there are no new species of fungi listed.

References: Lindau and Sydow number 37578. Sayre p. 39. Nederl. Kruidk. Arch. II 1: 50-97. 1871. TL-2/3: 860.

I. HERBARIUM VIVUM MYCOLOGICUM, SISTEMS FUNGORUM PER TOTAM GERMANIUM CRESCENTIUM COLLECTIONEM PERFECTAM. Cent. 1-2. Numbers 1-200. 1832. Dresden. Edited by Klotzsch.

II. KLOTZSCHII HERBARIUM VIVUM MYCOLOGICUM, SISTEMS FUNGORUM PER TOTAM GERMANIUM CRESCENTIUM COLLECTIONEM PERFECTAM. Cent. 3-20. Numbers 201-2000. 1842-1855. Dresden. Edited by Rabenhorst.

III. KLOTZSCHII HERBARIUM VIVUM MYCOLOGICUM, SISTEMS FUNGORUM PER TOTAM GERMANIAM CRESCENTIUM COLLECTIONEM PERFECTAM. EDITIO NOVO. Cent. I-VIII. Numbers 1-800. 1855-1858, Dresden. Edited by Rabenhorst. Announced in Bot. Zeit. 12(9): 151-152. 1854.

IV. FUNGI EUROPAEI EXSICCATI, KLOTZSCHII HERBARII VIVI MYCOLOGICI CONTINUATIO. EDITIO NOVA. Series Secunda. Cent. 1-26. Numbers 1-2600. 1859-1881. Dresden. Edited by Rabenhorst.

V. L. RABENHORSTII FUNGI EUROPAEI ET EXTRAEUROPAE. EXSICCATI. KLOTZSCHII HERBARII VIVI MYCOLOGICI CONTINUATIO. EDITIO NOVO. SERIES SECUNDA. Cent. 27-36. Numbers 2601-3600. 1881-1886. Dresden. [Leipzig]. Edited by Winter.

VI. L. RABENHORSTII ET G. WINTER FUNGI EUROPAEI ET EXTRAEUROPAEI, KLOTZSCHII HERBARIA VIVI MYCOLOGICI CONTINUATIO. Cent. 37-45. Numbers 3601-4500. 1890-1903. Leipzig. Edited by Pazschke.

Klotzsch, Johann Friedrich (1805-1860), Rabenhorst, Gottlob Ludwig (1806-1881), Winter, Georg (1848-1887), Pazschke, Franz Otto (1843-1922).

DATES OF PUBLICATION: From Kohlmeyer, Nova Hedwigia Beih. 4:1-230.

I,II. Cent. 1-20.

1	1832	
2	1832	
*3	1842	Bot. Zeitung 1(1):30-34. 1843.
*4	1842	Bot. Zeitung 1(30):515-517. 1846.
*5	1843	Bot. Zeitung 2(10):171-173. 1844.
*6	1844	Bot. Zeitung 2(24):425-427. 1844.
*7	1844	Bot. Zeitung 3(4):65-68. 1845.
*8	1845	Bot. Zeitung 3(33):557-559. 1845.
*9	1846	Bot. Zeitung 4(3):45-47. 1846.
*10	1846	Bot. Zeitung 4(25):434-437. 1846.
*11	1846	Bot. Zeitung 4(51):876-880. 1846.
*12	1847	Bot. Zeitung 6(14):292-295. 1848.
*13	1849	Bot. Zeitung 7(15):293-296. 1849.
*14	1850	Bot. Zeitung 8(22):438-440. 1850.
*15	1850	Bot. Zeitung 9(9): 178-183. 1851.
16	1851	
*17	1852	Bot. Zeitung 10(16):285-288. 1852.
*18	1853	Bot. Zeitung 11(13):235-239. 1853.
*19	1854	Bot. Zeitung 12(11):185-191. 1854.
*20	1855	Bot. Zeitung 13(16):282-287. 1855.

III. Cent. 1-8.

*1	1855	Bot. Zeitung 13(34):596-600. 1855.
2	1855	Bot. Zeitung 14(5):85-88. 1856.
3	1856	Bot. Zeitung 14(24):426-429. 1856.
*4	1857	Bot. Zeitung 15(6):93-96. 1857.
*5	1857	Bot. Zeitung 15(10):171-175. 1857.
6	1857	Bot. Zeitung 15(24):405-408. 1857. Bot. Zeitung 15(25):427-430. 1857.
7	1856	Bot. Zeitung 16(11):79-80. 1858.
8	1858	Bot. Zeitung 16(12):302-304. 1858.

IV-VI. Cent. 1-45.

*1	1859	Bot. Zeitung 17(34):295-296. 1859. Bot. Zeitung 17(35):303-304. 1859.
*2	1860	Bot. Zeitung 18(19):173-175. 1860.
*3	1860	Bot. Zeitung 19(16):101-104. 1861.

4	301-400	1861	
*5	401-500	1862	Bot. Zeitung 20(25):197-200. 1862.
*6	501-600	1863	Bot. Zeitung 21(29):228-231. 1862.
*7	601-700	1864	Bot. Zeitung 22(24):172-176. 1864.
*8	701-800	1865	Bot. Zeitung 23(31):249-252. 1865.
*9	801-900	1865	Bot. Zeitung 23(38):287-288. 1865. Bot. Zeitung 23(39):294-296. 1865.
*10	901-1000	1866	Bot. Zeitung 24(39):299-300. 1866. Bot. Zeitung 24(40):307-308. 1866.
*11	1001-1100	1866	Bot. Zeitung 24(51):403-404. 1866. Bot. Zeitung 24(52):411-412. 1866.
*12	1101-1200	1868	Bot. Zeitung 26(34):542-543. 1868. Bot. Zeitung 26(34):558-560. 1868.
13	1201-1300	1869	Bot. Zeitung 27(26):431-432. 1869.
14	1301-1400	1870	Bot. Zeitung 28(48):774-775. 1870.
15	1401-1500	1871	Bot. Zeitung 29(52):896-897. 1871.
16	1501-1600	1872	Bot. Zeitung 30(48):852. 1872.
17	1601-1700	1873	Bot. Zeitung 31(36):575. 1873 (notice only).
18	1701-1800	1874	Bot. Zeitung 32(10):159. 1874 (notice only).
19	1801-1900	1874	Bot. Zeitung 32(41):670. 1874 (notice only).
20	1901-2000	1875	
21	2001-2100	1876	Bot. Zeitung 34(14):224. 1876 (notice only).
22	2101-2200		
23	2201-2300	1876	
24	2301-2400	1876	
25	2401-2500	1876	
26	2501-2600	1881	Bot. Zeitung 39(7):118. 1881; Bot. Centralbl. 2(9): 288. 1881.
27	2601-2700		*Bot. Centralbl. 3(11):405-406. 1882.
28	2701-2800	1882	Bot. Zeitung 41(6):104. 1883.
29	2801-2900		
30	2901-3000	1883	Bot. Zeitung 41(51):864. 1883.
31	3001-3100	1884	
32	3101-3200	1884	
33	3201-3300	1885	Bot. Zeitung 44(9):174. 1886 (5 Mar).
34	3301-3400		
35	3401-3500	1886	
36	3501-3600	1886	
37	3601-3700	1890	Bot. Centralbl. 43(9):292. 1890 (27 Aug).
38	3701-3800	1891	
39	3801-3900	1892	Bot. Centralbl. 53(2):42. 1893 (3 Jan).
40	3901-4000	1893	
41	4001-4100	1895	
42	4101-4200	1898	Bot. Centralbl. 75(9):268-269. 1898 (24 Aug).
43	4201-4300	1901	Bot. Centralbl. 88(3):95. 1901 (17 Oct).
44	4301-4400	1903	
45	4401-4500		

Notes: The history of these sets has been well documented by Kohlmeyer (cited above) and in Stevens on p. 274-296 and Taxon 16: 112-119, 1967. Both authors pointed out that there were specimen substitutions in the sets. These are important sets because new taxa were frequently described. Kohlmeyer lists herbaria holding all or part of the series. Probably none of those listed below are complete.

The first three centuries in FH copies are incomplete and are represented by numbers sent Farlow by Duby. Duby stated that he could not obtain a complete set, even from Klotzsch.

References: See TL-2/4:396 (Preuss), TL-2/2:569 (Klotzsch), TL-2/4:461 (Rabenhorst).

2 FH (1 partial dist.), BPI, CUP (partial set), UPS, S, HBG (partial)

*contents listed with brief description

HERBIER CRYPTOGAMIQUE OU COLLECTION DES PLANTES CRYPTOGAMES ET AGAMES QUI CROISSENT EN BELGIQUE. Fasc. I-XXVIII. Numbers 1-1400. 1845-1859. Bruges and Courtrai.

Westendorf, Gérard Daniel (1813-1868) and Wallys, Antoine Charles François (1812-1881).

DATES OF PUBLICATION: Sayre p. 56.

Fasc.	Numbers	Date
1-3	1-150	1845
4-5	151-250	1846
6-7	251-350	1847
8-9	351-450	1849
10	451-500	1850
11-12	501-600	1851
13-14	601-700	1852
15-16	701-800	1853
17-20	801-1000	1854
21-24	1001-1200	1855
25-28	1201-1400	1859

Notes: Fascicles 1-7 (nos. 1-350) were prepared by Westendorf. The remainder were jointly prepared by Westendorf and Wallys.

This set requires careful comparison of numbers and names. In one Farlow set there are handwritten labels which differ from the printed labels in the other set. There are several examples of specimen substitution.

References: Bot. Kal. 1899. p. 118.

3 FH (2 sets, one partial are undistributed; 1 dist.), BPI (no. 465-1394), BM (list)

HONGOS SUD-AMERICANOS: DECADES MYCOLOGIAE ARGENTINAE. Decades 1-5. Numbers 1-50. April 20, 1881. Buenos Aires.

Spegazzini, Carlos (1858-1926)

DATES OF PUBLICATION: From spine.

Decade	Number	Date
1-5	1-50	Apr 20, 1881

Notes: The set, though limited, contained some type collections of taxa Spegazzini described in Anal. Sci. Cient. Arg. 10: 1881.

References: Stevenson p. 399-400. Lindau and Sydow no. 25542.

FH, BPI, BM (list)

I FUNGHI PARASSITI DELLE PIANTE COLTIVATE OD UTILI ESSICCATI, DELINEATI E DESCRITTI. Fasc. 1-19. Numbers 1-475. 1888-1926. Pavia, Italy.

Briosi, Giovanni (1846-1919), Cavara, Fridiano (1857-1929), Pollacci, Gino (1872-1963).

DATES OF PUBLICATION: From title page.

Fasc.	Number		
I	1-25	1888	
II	26-50	1889	
III & IV	51-100	[1889]	No title page. Collections from 1889.
V	101-125	[1890]	No title page. Collections from 1890.
VI	126-150	1891	
VII & VIII	151-200	1892	
IX	201-225	1893	
X	226-250	1894	
XI	251-275	1896	
XII	276-300	1897	
XIII-XIV	301-350	1900	*Bot. Centralbl. 84(1):14-15. 1900 (26 Sept).
XV	351-375	[1903]	Index Jul 14, 1903 at FH.
XVI	376-400	[1905]	Received Jan. 3, 1905 at FH.
XVII	401-425	1908	
XVIII	426-450	1921	
XIX	451-475	1926	

Notes: Fasc. I-XVII were edited by Briosi and Cavara; XVII-XIX by Cavara and Pollacci. Copies were advertised for sale at 10 lire.

The set is an impressive one with detailed illustrations with descriptions of all specimens.

Indices were printed with each fascicle. An index to I-X is found with X in FH. FH copies are in original bindings.

References: TL-2/1: 327, Bot. Kal. 1899. p. 118.

FH. BPI (no. 1-400, 426-475), UPS, S, BM (list), PC, HBG

*with descriptions of new taxa

I MICETI PATOGENI DILLUOMO E DEGLI ANIMALI. Fasc. 1-10. Numbers 1-100. 1922-1930. Siena (1-6), Bologna (7-10).

Pollacci, Gino (1872-1963)
Nannizzi, Arturo (1877-1961)

DATES OF PUBLICATION: From title pages of fascicles.

Fasc.	Number	Date
1	1-10	1922
2	11-20	1923
3	21-30	1924
4	31-40	1925
5	41-50	1926
6	51-60	1927
7-8	61-80	1928
9-10	81-100	1930

Notes: This is a set of microscope slides. Indices were provided with descriptive material. The slides were issued with double page descriptions and illustrations. References were listed separately and a glossary was issued with fascicle 1.

FH, BPI, PC (1-6 only)

INDIANA FLORA, PARASITIC FUNGI. Series 1. Numbers 1-100. Dec. 1894. Greencastle, Ill.

Underwood, Lucien Marcus (1853-1907)

DATES OF PUBLICATION: From Stevenson p. 477-478.

Notes: A list of specimens was published, Proc. Indiana Acad. Sci. 1894, p. 154-156. Stevenson lists sets at the following: BPI, DPU, FH, NCU, NY, PUR. Labels are printed with handwritten numbers and names.

References: Lindau and Sydow numbers 27520, 27523, HBG (partial)

FH, BPI.

KANSAS FUNGI. Fasc. 1-2. Numbers 1-50. May 1889-Aug. 1889. Manhattan, Kansas.

Kellerman, William Ashbrook (1850-1908)

Swingle, Walter Tennyson (1871-1952)

DATES OF PUBLICATION: Stevenson p. 233-235.

Fasc.	Numbers	Date	
1	1-25, 7b, 17b, 22b	Mai 1889	Bot. Centralbl. 40(2):39. 1889 (Oct. 9).
2	26-50, 38b, 43b, 50b,c	Aug 1889	Bot. Centralbl. 40(7):211. 1889 (12 Nov).

Notes: Contents are listed in Bot. Centralbl. notices. Stevenson notes that there were several type collections included. Another set entitled *Kansas Fungi* by H. F. Roberts was issued in 1912. See the excluded section for further information.

References: TL-2/2: 517, Bot. Kal. 1899. p. 119

FH, BPI, S, BM (list), NY

KLOTZSCHII HERBARIUM VIVUM MYCOLOGICUM. SEE HERBARIUM VIVUM MYCOLOGICUM.

KRYPTOGAMAE GERMANIAE, AUSTRIAE ET HELVETIAE EXSICCATAE. Fasc. 1-62. Numbers 1-1500. 1902-1933. Karlsruhe.

Migula, Emil Friedrich August Walter (1863-1938)

DATES OF PUBLICATION: See FH copy for title page.

Fasc.	Number	Date
3	1-25	15 Nov 1902
6	26-50	10 Apr 1903
13	51-75	20 Jan 1904
14	76-100	
19	101-125	10 Jul 1904
23	126-150	31 Dec 1904
24	151-175	
33	176-200	20 Mar 1907
34	201-225	
39	226-250	20 Oct 1922
40	251-275	
43	276-300	15 Dec 1927
44	301-325	
50	326-350	15 Oct 1931
51	351-375	
56	376-400	1 Nov 1933
57	401-425	

Notes: Fascicles listed above contain only fungi; for other classes, see Sayre. J. Brunnthaler, Bubák, Matouschek, Schinz, Vill, Weese, Bornmüller, Jaap and Schneider were all collaborators. Indices were included with fascicle.

There are occasional new species in later fascicles: No. 381. *Coryneum sorbi* Mig., no. 392. *Phyllosticta acericola* Mig., no. 393. *Phyllosticta aggregata* Mig., and others. These have German descriptions.

References: Lindau and Sydow 17838, Sayre p. 35, TL-2/3:474. 1981.

FH, BPI, CUP, S, C (dist.), NY, HBG

KRYPTOGAMAS EXSICCATAS EDITAE A MUSEO PALATINO VINDOBONENSI. Cent. I-XLV. Numbers 1-4500. 1894-1976. Wien.

Beck von Mannagetta und Lerehenau, Gunther (Ritter) (1856-1931), Zahlbruckner, Alexander (1860-1938), Keissler, Karl von (Ritter) (1872-1965), Petrak, Franz (1886-1973), Rechinger, Karl (1867-1952), Szatala, Odon (1889-1958), Baumgartner, Julius (1870-1955).

DATES OF PUBLICATION: From FH accession lists and reviews.

Cent.	Decades	Numbers	Date	
1	1-4	1-40	1894	Bot. Centralbl. 61(6):224-225. 1895 (6 Feb).
2	5-8	101-140	1896	Hedwigia 35:(125). 1896. *Bot. Centralbl. 68(4):115-117. 1896 (21 Oct).
3	9-10	201-220	1897	Hedwigia 36:(30). 1897. *Bot. Centralbl. 73(9):303-305. 1898 (23 Feb).

Cent.	Decades	Numbers	Date of Schedae		
4	11-13	301-330	1898	Hedwigia 37:(83). 1898. *Bot. Centralbl. 81(4):137-139. 1898 (17 Jan).	
5	14-15	401-420	1900	Hedwigia 39: (220). 1900.	*Bot. Centralbl. 84(9): 289-290. 1901 (22 Mai).
6	16-18	501-530	1900	Hedwigia 39: (220). 1900.	
7	19-21	601-630	1901	Hedwigia 41:(47). 1902.	
8	22-24	701-730	1902	Hedwigia 41:(253). 1902.	
9	25-28	801-840	1903	Hedwigia 43:(122). 1904.	
10	29-32	901-940	1904	Hedwigia 44:(134). 1905.	
	33-35	941-970	1904	Hedwigia 44:(134). 1905.	
	36-38	971-1000	1904	Hedwigia 44:(134). 1905.	
12	39-43	1101-1150	1905	Hedwigia 46:(86). 1907.	
	44-48	1151-1200	1905	Hedwigia 46:(86). 1907.	
14	49-52	1301-1325	1906	Hedwigia 48:(195). 1909.	
		1326-1340	1906		
15	53-55	1401-1430	1907	Hedwigia 48:(195). 1909.	
	56-58	1431-1460	1908	Hedwigia 48:(195). 1909.	
	59-62	1461-1500	1908	Hedwigia 48:(195). 1909.	
17	63-65	1601-1630	1909	Indexed FH Mar 21, 1910.	
18	66-67	1701-1720	1910	Hedwigia 51:(82). 1911.	
	68-69	1721-1740	1911	Hedwigia 51:(82). 1911.	
19	70-71	1801-1820	1911	Indexed FH Apr 19, 1912.	
	72-73	1821-1840	1911	Indexed FH Apr 19, 1912.	
20	74-75	1901-1920	1912	Hedwigia 53(163). 1912.	
	76-77	1921-1940	1912	Hedwigia 53(163). 1912.	
21	78-79	2001-2020	1913	Received FH 13 Nov 1913	
	80-81	1221-1240?	1913	Received FH 13 Nov 1913	
22	82-83	2101-2120	1914		
	84	2121-2130	1914	Indexed FH 12 Mar 1935.	
23	85-87	2201-2230	1915	Hedwigia 63:(96). 1922.	
	88	2231-2240	1915	Hedwigia 63:(96). 1922.	
24	89-91	2301-2330	1916	Hedwigia 63:(96). 1922.	
25	92-94	2401-2430		Indexed FH Mai 23, 1920.	
26	[95-97]	2501-2530	1923		
27	98-103	2001-2660	1923		
28	[104-107]	2701-2740	1924		
29	[108-109]	2801-2820	1925		
	[110-111]	2821-2840	1925		
30	112-115	2901-2940	1926		
31	116-119	3001-3020	1928		
32	120-121	3101-3120	1933	Hedwigia 74:(138). 1933.	
33	[122-131]	3201-3300	1941		
34	[132-141]	3301-3400			
35	[142-148]	3401-3470	1942		
36		3501-3570		Sayre says that Century 36 was not published	
37		3601-3700	1948		
38		3701-3710	1951		
39		3801-3810	1955		
40		3901-3910	1957		
41		4001-4010			
42		4101-4110	1958		
44		4301-4310	1961		
45		4401-4430	1963		
46		4501-4550	1965		
47		4601-4670			
48	180-182	4701-4730	Oct 1976		

Notes: Editors were: Cent. 1-4, Beck and Zahlbruckner; 5-26, Zahlbruckner; 27-32, Keissler; 33-45, Petrak; 46-48 ?

References: TL-2/1:157, Stevenson p. 239-251, Lindau and Sydow numbers 2245, 14489, Sayre p. 31.

FH, BPI, UPS (1-100, 500-4730), C (dist.), PC (dist.), HBG

KRYPTOGAMEN BADENS, UNTER MITWIRKUNG MEHRER BOTANIKER, GESAMMELT UND HERAUSGEGEBEN von JOS. BERNH. JACK, LUDWIG LEINER UND DR. ERNST STITZENBERGER. Fasc. I-XXI. Number 1-1000. 1860-1880. Constanz.

Jack, Joseph Bernhard (1818-1901), Leiner, Ludwig (1830-1901), Stitzenberger, Ernst (1827-1895).

DATES OF PUBLICATION: Only reviews in Bot. Zeitung are noted; Sayre, p. 29, dates the series in agreement with these.

Fasc.	Numbers	Date	
1	1-40	1860	Bot. Zeitung 18(15):134-136. 1860 (13 Apr).
2	41-100	1860	
3	101-140	1860	
4	141-200	1860	
5	201-250	1860	
6	251-300	1860	
7	301-340	1861	Bot. Zeitung 19(6):44. 1861 (8 Feb).
8	341-400	1861	
9	401-440	1861	Bot. Zeitung 19(41):303-304. 1861 (11 Oct).
10	441-500	1861	
11	501-540	1863	Bot. Zeitung 21(1):8. 1863 (2 Jan).
12	541-600	1863	
13	601-660	1864	Bot. Zeitung 22(46):351-352. 1864 (12 Nov).
14	661-690	1864	
15	691-710	1864	Bot. Zeitung 22(53):415-416. 1864 (30 Dec).
16	711-770	1864	
17	771-800	1864	
18	801-865	1870	Bot. Zeitung 28(48):775-776. 1870 (2 Dec).
19	866-900	1870	
20	901-937	1880	Bot. Zeitung 38(44):751. 1880 (29 Oct).
21	938-1000	1880	

Notes: Contents of Fasc. 20 and 21 are listed in Bot. Centralbl. 1(42/43): 1342. 1880.

Lagerheim, G. V., Revision der im Exsiccat "Kryptogamen Badens von Jack, Leiner and Stitzenberger" enthaltenen Chytridiaceen, Peronosporeen Ustilagineen und Uredineen. Bot. Centralbl. 38 (13):849-850. 1889. Mitt. badishen bot. Ver. no. 59. 1889.

References: TL-2/2: 394, Bot. Kal. 1899. p. 117.

FH, UPS, S, BM (list), HBG

L. RABENHORSTII ET G. WINTER FUNGI EUROPAEI ET EXTRAEUROPAEI.

SEE HERBARIUM VIVUM MYCOLOGICUM.

L. RABENHORSTII FUNGI EUROPAEI ET EXTRAEUROPAE. SEE HERBARIUM VIVUM MYCOLOGICUM.

MAGYARORSZÁG GOMBÁI. SEE FUNGI HUNGARICI EXSICCATI.

MECKLENBERGISCHE KRYPTOGAMEN. UNTER MITWIRKUNG MEHRER BOTANIKER GESAMMELT UND HERAUSGEGEBEN VON H. BROCKMÜLLER. Fasc. I-VI. Numbers 1-300. 1862-1868. Schwerin (Bärensprung).

Brockmüller, Hans Joachim Heinrich (1821-1882).

DATES OF PUBLICATION: See Sayre p. 10.

Fasc.	Numbers	Date	
1	1-50	1862	Bot. Zeitung 20(32): 254. 1862. (8 Aug).
2	51-100	1862	Bot. Zeitung 21(38): 284. 1863 (18 Sep).
3	101-150	1863	Bot. Zeitung 22(22): 156. 1864 (27 Mai).
4	151-200	1863	Bot. Zeitung 22(23): 162. 1864 (3 Jun).
5	201-250	1865	Bot. Zeitung 24(50): 394, 395 1866 (14 Dec).
6	251-300	1868	Bot. Zeitung 27(29): 488. 1869 (16 Jul) [notice only].

Notes: For listings of contents, see Bot. Zeitung as stated above. Many species of fungi are included. There are no new species noted.

References: TL-2/1: 350, Bot. Kal. 1899. p. 116.

MICRO-FUNGI BRITANICI. Cent. 1-6. Numbers 1-600. 1878-1888. Forden. Vicarage,Welshpool.

Vize, John Edward (1830 or 1831-1916)

DATES OF PUBLICATION: From title page and reviews.

Cent.	Number	Date from t.p.	Review and notices
1	1-100	1878	Grevillea 6(40):159. 1879 (Jun); Bot. Zeitung 37 (18):295. 1879 (2 Mai).
2	101-200	1879	Grevillea 7(43):116. 1879 (Mai).
3	201-300	1880	Grevillea 9(49):40. 1880 (Sep).
4	301-400	1882	Grevillea 10(56):155. 1882 (Jun); Bot. Zeitung 40(50):897. 1879 (15 Dec).
5	401-500	1884	Grevillea 13(67):88. 1885 (Mar).
6	501-600	1888	Grevillea 17(83):71. 1889 (Mar).

Notes: Specimens were glued directly to small sheets or were packeted. Names were pasted on the pages. Centuries were published with indices which were often hand corrected. No new species were included.

References: Lindau and Sydow no. 27881, Bot. Kal. 1899. p. 120.

FH, BM (list).

MICRO-FUNGI EXOTICI. Fasc. 1. Numbers 1-40. 1882. Forden Vicarage, Welshpool.

Vize, John Edward (1830 or 1831-1916)

DATES OF PUBLICATION: From title page.

Notes: The set contains some miscellaneous collections from the East Indies made by General Hobson. Title page and labels are all handwritten. Bot. Zeitung 40(50):897. 1882 lists this title with a fasc. XI for which I have seen no other reference.

References: Grevillea 10(55):119. 1882 (Mar). Hedwigia 22(3):48. 1883 (Mar). Lindau and Sydow no. 27883.

FH, BM (list)

MICROMYCETES RARIORES SELECTI PRAECIPERE SCANDINAVICI. Fasc. 1-72. Numbers 1-1800. Jan. 1899-May 1914. Uppsala (fasc. 1-17), Stockholm (fasc. 18-72).

Vestergren, Jacob Tycho (1875-1930).

DATES OF PUBLICATION: See Stevenson, p. 481-493.

Fasc.	Numbers	Date
1	1-25	Jan 1899
2	26-50, 2 extra	Jan 1899
3	51-75, 1 extra	Jan 1899
4	76-100, 1 extra	Mai 1899
5	101-125	Mai 1899
6	126-150	Mai 1899
7	151-175, 7 extra	Oct 1899
8	176-200, 2 extra	Oct 1899
9	201-225, 2 extra	Oct 1899
10	226-250, 1 extra	Oct 1899
11	251-275, 1 extra	Apr 1900
12	276-300, 2 extra	Apr 1900
13	301-325	Dec 1900
14	326-350, 1 extra	Dec 1900
15	351-375, 1 extra	Dec 1900
16	376-400, 2 extra	Mai 1901
17	401-425, 2 extra	Mai 1901
18	426-450, 6 extra	Jan 1902
19	451-475, 4 extra	Jan 1902
20	476-500, 7 extra	Mai 1902
21	501-525, 1 extra	Mai 1902
22	526-550, 4 extra	Mai 1902
23	551-575, 2 extra	Mai 1902
24	576-600, 6 extra	Dec 1902
25	601-625	Dec 1902
26	626-650, 2 extra	Mai 1903
27	651-675, 2 extra	Mai 1903
28	676-700, 6 extra	Oct 1903
29	701-725, 5 extra	Oct 1903
30	726-750, 2 extra	Oct 1903
31 32	751-800, 6 extra	Mar 1904
33 34	801-850, 3 extra	Mar 1904
35 36	851-900, 3 extra	Feb 1905

Fasc.	Numbers	Date
37 38	901-950, 5 extra	Feb 1905
39 40	951-1000, 2 extra	Feb 1905
41 42	1001-1050, 6 extra	Jan 1906
43 44	1051-1100, 11 extra	Jan 1906
45 46	1101-1150	Jul 1906
47 48	1151-1200, 7 extra	Apr 1907
49 50	1201-1250, 3 extra	Apr 1907
51 52	1251-1300, 2 extra	Apr 1908
53 54	1301-1350, 4 extra	Apr 1908
55 56	1351-1400, 1 extra	Jul 1909
57 58	1401-1450	Jul 1909
59 60	1451-1500, 2 extra	Apr 1911
61 62	1501-1550, 3 extra	Mar 1912
63 64	1551-1600, 7 extra	Jan 1913
65 66	1601-1650, 2 extra	Jan 1913
67 68	1651-1700, 1 extra	Nov 1913
69 70	1701-1750, 2 extra	Mai 1914
71 72	1751-1800, 2 extra	Mai 1914

Notes: Type collections were included but these were previously described. A number of collaborators were enlisted over the years including F. Bubák, G. Lagerheim, N. Patouillard. Some labels were corrected and reissued.

References: Lindau and Sydow nos. 27690, 27692, 40232, 40235. There are many notices and reviews in Hedwigia.

FH (partial set dist.), BPI, UPS, S, C (dist.), HBG

MYCOBIOTA OF NORTH AMERICA. Fasc. 1-11. Numbers 1-450. Dec. 1939-Aug. 1951. Cincinnati, Ohio.

Cooke, William Bridge (1908-)

DATES OF PUBLICATION: See Stevenson p. 92-95.

Fasc.	Numbers	Date
1	1-25	Dec 1939
2	26-50	Jan 1940
3	51-70	Apr 1940

Fasc.	Numbers	Date
4	71-115	Nov 1940
5	116-150	Jan 1943
6	151-200	Mar 1946
7	201-250	Jan 1947
8	251-300	Jan 1948
9	301-350	Feb 1950
10	351-400	Jan 1951
11	401-450	Aug 1951

Notes: On certain numbers, the labels were subtitled *Mycobiota of Mount Shasta*.

References: TL-2/1:544.

FH, BPI, CUP, UPS (dist.), NY

MYCOFLORA DOMINGENSIS EXSICCATA. Cent. 1-4. Numbers 1-425. 1930-1956. Moca, Dominican Rep. (Fasc. 1-2), Pavia, Italy (Cent. 3-4).

Ciferri, Rafael (1897-1964)

DATES OF PUBLICATION: See Stevenson p. 82-87.

Cent.	Numbers	Date
1	1-100, 33 extra	1930
2	101-200, 19 extra	1931
3	201-300, 14 extra	1932
4	301-425, 12 extra	1956

Notes: A number of isotypes were included.

FH, BPI, CUP

MYCOFLORA SAXIMONTANENSIS EXSICCATA. Centum 1-17. Numbers 1-1700. Aug. 1934, 1977. Laramie, Wyoming.

Solheim, Wilhelm Gerhard (1898-1978)
Cummins, George Baker (1904-)

DATES OF PUBLICATION: See Stevenson p. 392-398 and FH accession records.

Cent.	Number	Date
1	1-100	Aug 1934
2	101-200	Sep 1937
3	201-300	May 1940
4	301-400	Jul 1943
5	401-500	Jul 1950
6	501-600	Jul 1950
7	601-700	Jul 1957
8	701-800	Jul 1957
9	801-900	Jul 1959
10	901-1000	Jul 1959
11	1001-1100	Jul 1960
12	1101-1200	Jul 1960
13	1201-1300	Mai 1967

14	1301-1400	Oct 1971 received FH
15	1401-1500	
16	1501-1600	Jan 1974 received FH
17	1601-1700	Jul 1, 1977 received FH

Notes: Centuries 8, 9, 10, and 11 were jointly edited by Solheim and Cummins and contained Uredinales. Schedae for the last two centuries were published in Mycotaxon 8: 385-401. 1979.

FH, BPI, CUP, NY

MYCOLOGIA BRITANNICA or SPECIMENS OF BRITISH FUNGI. Fasc. 1 & 2. 100 Spec.

Ayres, Philip Burnard (1813-1863)

Note: This set is known only by title; see Ann. Mag. Nat. Hist. 15: 349. 1845, in which the following appears:

"This is a welcome addition, especially to the admirers of Epiphyllous Fungi, to the various collections of Fungi which have been published in this and other countries. It is not at all probable that Mr. Berkeley's 'British Fungi' will be continued beyond the Fourth Fasciculus; we shall be rejoiced therefore if the present work should be encouraged sufficiently to ensure its continuence, so that it may take its place. The specimens are neatly prepared and correctly named, and we doubt not that in future numbers they will not be so much confined to a single division. Aecidium Galiatum DeC. and Ae. Scrophulariae DeC., are new to our flora, and Ae. pallidum, a pretty species on Galium Aparine, has been hitherto unnoticed. The specimens, fifty in number, are so arranged that they can at pleasure be transferred to the herbarium."

References: BM (list), B&B, Herbarium 1:161.

MYCOTHECA BOREALI-AFRICANA. Fasc. 1-16. Numbers 1-400, 1912-1919.

Maire, René (1879-1949)

DATES OF PUBLICATION: From Hedwigia and title pages.

Fasc.	Numbers		Date	
1	1-25		1912	Hedwigia 53(1):(93). 1912 (Nov).
2,3	26-75		1912	Hedwigia 53(3):(233). 1913 (Apr).
4	76-100		1913	Hedwigia 54(2):(125). 1914 (Nov).
5	101-125		1914	Hedwigia 55(2):(151). 1914 (Sep).
6	126-150	Mai	1914	Herbarium 1(37):345. 1914.
7	151-175	Mai	1914	
8	176-200	Nov	1916	
9	201-225	Nov	1916	
10	226-250	Apr	1917	
11	251-275	Dec	1917	
12	276-300	Dec	1917	
13	301-325	Jun	1919	
14	326-350	Jun	1919	
15	351-375	Jun	1919	
16	376-400	Jun	1919	

Notes: New species were described throughout. Latin descriptions were on the labels. Several, however, were listed as "n.sp. ad interim." For Schedae with descriptions, see Bull. Soc. Hist. Nat. Afrique du Nord 1917, 1919.

References: TL-2/3: 257.

FH, UPS, S, PC (fasc. 1-4)

MYCOTHECA BRASILIENSIS. Cent. 1. Numbers 1-100. 1905. Appendix 1-36. 1905. Dresden.

Ule, Ernst Heinrich George (1854-1915)

DATES OF PUBLICATION: From Stevenson p. 472-476.

Notes: For additional information on the Ule Brasilian Collections see: Liste der Pilze der Kollektion E. Ule aus Brasilien (1883-1903) im Herbarium Hamburgense. Mitt. Staatsinst. Allg. Bot. Hamburg 14: 95-134. 1973. Stevenson lists the following extra numbers: 49b, 53b, 68b, 76b, 81b, 96b and 32b from the appendix.

References: Lindau and Sydow number 27502.

FH, BPI, UPS, C (dist.), PC (dist.), HBG

MYCOTHECA CARPATICA. Numbers 1-475.

Petrak, Franz (1886-1973)

DATES OF PUBLICATION: From accession lists FH.

Numbers		
1-150	Received FH	1921
151-200	Received FH	1921
201-400	Received FH	1924
401-475	Received FH	1927

Notes: Titles are printed on the labels; all other information is handwritten. There is no indication of the unit of issuance nor have I seen any reviews in journals of this set. See TL-2/4: 205.

FH

MYCOTHECA ESTONICA. Fasc. 1-3. Numbers 1-75. 1957-1961. Tartu.

Parmasto, Erast (1928-)

DATES OF PUBLICATION: From title page

Fasc.	Number	
1	1-25	1957
2	26-50	1959
3	51-75	1961

Notes: Schedae were published by the "Institutum Zoologicum et Botanicum Academiae Scientiarum R.P.S.S. Estonicae."

The only nomenclatural novelty is no. 25, *Tyromyces Kravtzevianus* Bond. et Parmasto which was proposed as a *nomen novum.*

FH, BPI, UPS (dist.), E (listed in TL-2/4:205.)

MYCOTHECA FENNICA. Herausgegeben vom Institutum Phytopathologicum Universitatis Helsinkiensis. Fasc. 1-18. Numbers 1-900.

Liro [Lindroth], Johan Ivar (1872-1943)
Roivainen, Heikki (1900-)

DATES OF PUBLICATION: From title page.

Fasc.	Numbers	
1	1-50	20 Dec 1934
2	51-100	20 Dec 1934
3	101-150	28 Dec 1934
4	151-200	28 Dec 1934
5	201-250	28 Dec 1934
6	251-300	28 Dec 1934
7	301-350	27 Jan 1939
8	351-400	27 Jan 1939
9	401-450	27 Jan 1939
10	451-500	27 Jan 1939
11	501-550	27 Jan 1939
12	551-600	27 Jan 1939
13	601-650	30 Sep 1953
14	651-700	30 Sep 1953
15	701-750	30 Sep 1953
16	751-800	30 Sep 1953
17	801-850	30 Sep 1953
18	851-900	30 Sep 1953

Notes: FH has 1-6, 13-18. New species were described with German descriptions. No. 26. *Cintractia gigantospora* Liro, No. 28. *Cintractia irregularis* Liro, No. 63. *Entyloma fluitans* Liro nom. nov., No. 106. *Cintractia Karii* Liro, No. 194. *Uromyces pisi* (de Candolle) Liro comb. nov., no. 210. *Doassansia borealis* Liro, no. 212. *Burrillia limosellae* (Kunze) Liro nov. comb., no. 260. *Uromyces pisi* (de Candolle) Liro, nov. comb.

Most material is of leaf parasites. Schaedae were printed separately. Early in his career Liro published under his step-father's name, Linroth. Fasc. 13-18 were continued by H. Roivainen. See TL-2/3: 62.

FH, BPI, UPS (1-900), S (1-300), C (dist.)

MYCOTHECA GENERALIS. Lief. 1-42. Numbers 1-2100. 1928-
Mähren-Weisskirchen, Czechoslovakia (Lief. 1 & 2), Vienna.

Petrak, Frans (1886-1973)

DATES OF PUBLICATION: I have not been able to determine the dates of issuance of this series. Neither was Stevenson (pp. 265-271) apparently able to do so. Numbers 1-100 were apparently issued in Nov. 1928. These numbers were noted in Just's Bot. Jahr. 59(1): 444. 1939, covering the literature of 1930. The Farlow numbers 101-1200 were purchased from Petrak, 30 June 1954. Many type collections and authentic material were issued in the set. See TL-2/4: 205.

FH (one set, partly distributed), BPI (1-1800), UPS (distributed), S, NY (partial set dist.), HBG (partial)

MYCOTHECA GENERALIS SUPPLEMENT, REVUE DE MYCOLOGIE. EXSICCATA. Numbers 1-32.

Notes: Published as a supplement to Rev. Mycol. (Paris) beginning in vol. 1: 15. 1936. Also see note Rev. Mycol. (Paris) Suppl. 1: 48. 1936.

FH, CUP, NY, PC

MYCOTHECA GERMANICA. Fasc. 1-60. Numbers 1-3000. 1903-1942. Berlin.

Sydow, Hans (1879-1946) and Sydow, Paul (1851-1925)

DATES OF PUBLICATION: From title page and Ann. Mycol.

Fasc.	Numbers	Date	
1	1-50	1903	Ann. Mycol. 1: 519-521.
2	51-100	1903	Ann. Mycol. 1: 536-539.
3	101-150	1904	Ann. Mycol. 2: 190-192.
4	151-200	1904	Ann. Mycol. 2: 193-194.
5-6	201-300	1904	Ann. Mycol. 2: 527-530.
7	301-350	1905	Ann. Mycol. 3: 231-234.
8-9	351-450	1905	Ann. Mycol. 3: 418-421.
10-11	451-550	1906	Ann. Mycol. 4: 483-486.
12-13	551-650	Oct 1907	Ann. Mycol. 5: 395-399.
14-15	651-750	Nov 1908	Ann. Mycol. 6: 478-481.
16-17	751-850	Nov 1909	Ann. Mycol. 7: 437-440.
18-19	851-950	Sep 1910	Ann. Mycol. 8: 490-493.
20-21	951-1050	Oct 1911	Ann. Mycol. 9: 554-558.
22-23	1051-1150	Oct 1912	Ann. Mycol. 10: 445-451.
24	1151-1200	Sep 1913	Ann. Mycol. 11: 364-366.
25-26	1201-1300	Dec 1915	Ann. Mycol. 12: 535-538.
27-28	1301-1400	Mai 1916	Ann. Mycol. 14: 243-247.
29-36	1401-1800	Jul 1921	Ann. Mycol. 19: 132-144.
37-41	1801-2050	Jul 1923	Ann. Mycol. 21: 165-181.
42-46	2051-2250	Nov 1924	Ann. Mycol. 22: 257-268.
47-49	2251-2450	Feb 1929	Ann. Mycol. 27: 116-122.
50-52	2451-2600	Apr 1933	Ann. Mycol. 30: 394-401.
53-56	2601-2800	Jul 1934	Ann. Mycol. 32: 272-285.
57-60	2801-3000	Nov 1936	Ann. Mycol. 34: 387-401.
61-64	3001-3200	Sep 1938	Ann. Mycol. 36: 318-325.
65-68	3201-3400	Nov 1940	Ann. Mycol. 38: 453-473.
69-72	3401-3600	Oct 1942	Ann. Mycol. 40: 193-218.

Notes: In Annales Mycologici, taxa are listed by name and number, new species are described, and comments on previously described species are made.

References: Lindau and Sydow 26208, 39799.

FH (1-3200), BPI (nos. 1-3600), CUP, UPS (301-3600), S, C (dist.), PC (only 1-1200, others dist.), HBG

MYCOTHECA ITALICA. Cent. 1-18. Numbers 1-1750 (plus extra numbers). 1897-1905 (?1913). Padova.

Saccardo, Domenico (1872-1952)

DATES OF PUBLICATION: From title page and Hedwigia.

Cent.	Number		
1-2	1-200	1898	Hedwigia Beibl. 38(2):(112). 1899 (Mar-Apr).
3-4	201-400		Hedwigia Beibl. 38(2):(112). 1899 (Mar-Apr).
5-6	401-600	1900	
7-8	601-800	1901	
9-10	801-1000	1902	
11-12	1001-1200	1903	
13-14	1201-1400	1903	
15-16	1401-1600	1905	
17-18	1601-1750	1913	Hedwigia Beibl. 54(1):(59). 1913 (Sep).

Notes: Centuries 1-2 were sold at 30 Francs; later numbers were 40 Francs. Advertisement with last fasc. says to be continued as Fungi Italici Exsiccati by G. B. Traverso. Published with printed lists. There was a published index to Centuries 1-10. Under the title "Diagnoses specierum novarum" descriptions of new included species were given. In the first two centuries, the following new species were described: no. 8. *Exobasidium patavinum* D. Sacc., no. 139. *Dendrophoma clypeata* D. Sacc., no. 154. *Diplodia cocculi* D. Sacc., no. 177. *Gloeosporium victoriense* D. Sacc., no. 194. *Helminthosporium microsorum* D. Sacc., no. 302. *Leptosphaeria meridionalis* D. Sacc., no. 541. *Phyllosticta sojaecola* C. Mass., no. 559. *Septoria Vallisumbrosae* Car. & D. Sacc., no. 589. *Cladosporium microstictum* Sacc. & D. Sacc., no. 737. *Phoma cornicola* D. Sacc. (I have not seen description); no. 740. *Phoma Donacis* D. Sacc. (I have not seen description); no. 749. *Vermicularia carpogena* D. Sacc. (description not seen), no. 770. *Hainesia taphrinoides* D. Sacc. & Cav. (description not seen); no. 775. *Sporotrichum viridiflavum* Sacc. (description not seen); no. 782. *Ramularia sycina* Sacc. & D. Sacc. (description not seen); no. 787. *Cladosporum radians* Sacc. & D. Sacc. (description not seen); no. 789. *Cercospora Saccardiania* Scalia (description not seen). no. 790. *Cercospora Cavarac*. Sacc. & D. Sacc. (description not seen); no. 942. *Macrophoma capsuligena* D. Sacc. (with brief label description); no. 1206. *Hypochnus fulvescens* Sacc. in litt. (no description); no. 1264. *Aecidium Ranunculacearum* D.C. var. *Aleae* Trav. (1 Brief label description); no. 1314. *Aulagraphum anaxacum* Sacc. sp. nov. in litt. (no description); no. 1337. *Dendrophoma faginea* Ferraris sp.n. (nomen nud.); no. 1400. *Ectostroma silenes* D. Sacc. (with label description).

References: Lindau and Sydow number 23307, Bot. Kal. 1899. p. 120. TL-2/4: 1023. 1983.
FH, BPI (1-1719), S, BM (list), PC

MYCOTHECA MARCHICA. Cent. 1-49. Numbers 1-4900. 1880-1899. Berlin.

Sydow, Paul (1851-1926) and Zopf, Wilhelm (1846-1909) (century 1 only).

DATES OF PUBLICATION: Lindau and Sydow, Hedwigia, and Bot. Zeitung.

Cent.	Number		
1	1-100	1880	Hedwigia 24: 124. 1885., Bot. Zeitung 38(11):190. 1880.
2	101-200	1881	Bot. Zeitung 40(9): 159. 1882 (3 Mar).
3-4	201-400	1882	
5-6	401-600	1883	
7-8	601-800	1884	Bot. Zeitung 42(52):843. 1884 (24 Dec).
9-10	801-1000	1885	
11-13	1001-1300	1886	
14-19	1301-1900	1887	Bot. Zeitung 46(13). 204. 1888 (30 Mar).
20-25	1901-2500	1888	Bot. Zeitung 46(30). 481. 1888 (27 Jul) 20-21 only.
26-29	2501-2900	1889	
30-31	2901-3100	1890	
32-35	3101-3500	1891	
36-38	3501-3800	1892	
39	3801-3900	1893	Hedwigia Beibl. 33(1): (31). 1894 (Jan-Feb).
40	3901-4000	1893	Hedwigia Beibl. 33(1): (31). 1894 (Jan-Feb).
41	4001-4100	1894	Hedwigia Beibl. 33(3): (96). 1894 (Mai-Jun).
42	4101-4200	1894	Hedwigia Beibl. 33(6): (169). 1894 (Nov-Dec).
43	4201-4300	1895	Hedwigia Beibl. 34(2): (65-66). 1895 (Mar-Apr).*
44	4301-4400	1895	Hedwigia Beibl. 35(1): (31). 1896 (Jan-Feb).*
45	4401-4500	1896	Hedwigia Beibl. 35(2): (60-62). 1896 (Mar-Apr).*
46	4501-4600	1896	Hedwigia Beibl. 36(1): (32-34). 1897 (Jan-Feb).*
47	4601-4700	1897	
48	4701-4800	1898	Hedwigia Beibl. 37(5): (200-201). 1898 (Sep-Oct).*
49	4801-4900	1899	Hedwigia Beibl. 38(4/5): (246-247). 1899 (Jul-Oct).*

Notes: With some of the early numbers there are extensive notes. New species were described with Latin descriptions. Early labels are reproduced from handwritten copy, later ones were printed. At NY there is a manuscript book listing contents.

References: Lindau and Sydow #26222, Bot. Kal. 1899. p. 120.

FH (also misc. dist.), BPI (nos. 52-2431), UPS, S, BM (list), HBG (partial)

*contents listed

MYCOTHECA POLONICA. Fasc. 1-4. Numbers 1-200. 1910-1911. Lemberg [Lwów].

Raciborski, Maryan (1863-1917), Namyslowski, Bolesław (1882-1930)

DATES OF PUBLICATION: From FH exsiccatae file, Hedwigia, and Herbarium

Fasc.	Numbers	Date
1	1-50	1910 (indexed FH) Hedwigia 51(1):85. 1911 (Jun).
2	51-100	Feb. 23, 1911 (indexed FH) Herbarium 1(19):149. 1911.
3	101-150	Feb. 24, 1911 (indexed FH) Hedwigia 52(1):(81). 1912 (Mar). Herbarium 1(19):149. 1911.
4	151-200	July 1, 1911 (indexed FH) Hedwigia 52(1):(81). 1912 (Mar). Herbarium 1(22):182. 1911.

Notes: A description of no. 102. *Empusa (Entomophthora) Gastropachae* Rac. was in fasc. 3 with Polish diagnosis. Schedae were published in Kosmos, Lemberg 34: [1166]-1172. 1909, ibid. 35: [768]-781, [1007]-1012, 1910. Fascicles 1-3 were produced by Raciborski. Fascicle 4 was produced by Namysłowski.

References: TL-2/4: 529.

FH, BPI, CUP, UPS (1-50).

MYCOTHECA POLONICA. Fasc. 1-19. Numbers 1-475. 1959-1964. Yarsovia.

Kochman, Józef (-)

DATES OF PUBLICATION: From title page.

Fasc.	Number	
1	1-25	1959
2	26-50	1959
3	51-75	1959
4	76-100	1959
5	101-125	1959
6	126-150	1959
7	151-175	1959
8	176-200	1959
9	201-225	1959
10	226-250	1959
11	251-275	1959
12	276-300	1959
13	301-325	1964
14	326-350	1964
15	351-375	1964
16	376-400	1964
17	401-425	1964
18	426-450	1964
19	451-475	1964

Notes: Schedae separately published. Cited in Sałata (Grzyby [Mycota] Tom VI) up to fascicle 24 (1971). Kochman (Grzyby [Mycota] Tom V) cites fascicle 19 (1964), and fascicles 20-21 as 1971.

Schedae were published for fascicles 1-12 (no. 1-300) in 1959 and for 13-19 (no. 301-475) in 1964.

FH, UPS (1-300, 301-450), NY.

MYCOTHECA ROSSICA SIVE FUNGORUM ROSSIAE ET REGIONUM CONFINIUM ASIAE SPECIMINA EXSICCATA. Fasc. 1-7. 1910-1912. St. Petersburg [Jamoslawl].

Tranzschel, Waldemar Andrejevic (1868-1943)
Serebrianikow, J. (-)

DATES OF PUBLICATION: From title page and from Hedwigia.

Fasc.	Numbers	
1-2	1-100	Mar. 1910, Hedwigia Beibl. 51(1):(86). 1911 (Jun).
[3]-[4]	101-200	Mar. 1911, Hedwigia Beibl. 51(1):(86). 1911 (Jun).
5	201-250	Nov. 1911, Hedwigia Beibl. 51(3):(242). 1911 (Nov).
6-7	251-350	Aug. 1912, Hedwigia Beibl. 53(1):(95). 1911 (Nov.). Hedwigia Beibl. 53(3):(233). 1913 (Apr.)

Notes: New species were described; Latin descriptions were given with the index rather than on the label. Each fascicle was offered at 22 Francs or 17 Marks in the prospectus.

References: Lindau and Sydow no. 40023.

FH, CUP, UPS, C, PC, HBG

MYCOTHECA UNIVERSALIS. Cent. 1-23. Numbers 1-2300. 1875-1884. Bayreuth. Bavaria (cent. 1-2), Klosterneuburg, Austria (cent. 3-18), Vienna (cent. 19-22), Görz, Austria (cent. 23).

Thümen, Felix Karl Albert Ernst Joachim de (1839-1892)

DATES OF PUBLICATION: Stevenson p. 448-459.

Cent.	Number	Date	
1	1-100, 4 extra	1875	
2	101-200, 6 extra	1875	Bot. Zeitung 33(1): 16. 1875.
3	201-300, 6 extra	1875	
4	301-400, 4 extra	1876	
5	401-500, 1 extra	1876	
6	501-600, 2 extra	1876	
7	601-700, 1 extra	1877	
8	701-800	1877	
9	801-900, 5 extra	1877	
10	901-1000	1878	
11	1001-1100	1878	
12	1101-1200	1878	
13	1201-1300	1878	Bot. Zeitung 37(18):295. 1879.
14	1301-1400	1879	Bot. Zeitung 37(38):614. 1879.
15	1401-1500	1879	Bot. Zeitung 38(2):30. 1880, Bot. Zeitung 38(10):175. 1880, Bot. Centralbl. 1 (4/5):159. 1880.
16	1501-1600, 1 extra	1880	Bot. Zeitung 38(26):461. 1880.
17	1601-1700	1880	Bot. Zeitung 38(40):686. 1880; Bot. Centralbl. 1(26):799. 1880.*
18	1701-1800	1880	Bot. Zeitung 38(52):904. 1880.
19	1801-1900	1881	Bot. Zeitung 39(16):262. 1881 (22 Apr.)
20	1901-2000	1881	Bot. Zeitung 40(9):159. 1882.
21	2001-2100	1881	
22	2101-2200	1883	Bot. Zeitung 41(34):566. 1883 (24 Aug).
23	2201-2300	1884	Bot. Zeitung 42(38):608. 1884 (19 Sep).

Notes: New species were described in the set by de Thuemen, Passerini and others. Descriptions are in Latin. Most centuries were noted in Grevillea by Cooke. The first centuries were offered at 12 marks. A separate index for I-XII was published in 1880 (Bot. Zeitung 38(26):461. 1880), for XIII-XV in Flora 63: 313-332. 1880. Stevenson cites a manuscript index by F. J. Seaver which is at NY and BPI.

Reference: Bot. Kal. 1899. p. 120.

FH (partial set dist.), BPI (misc. 4-2300), UPS, S, C, BM (list), NY, HBG

*specimens listed

MYCOTHECA VENETA, SISTENS FUNGOS VENETOS EXSICCATOS. Cent. 1-16. Numbers 1-1600. Patavii.

Saccardo, Pier Andrea (1845-1920)

DATES OF PUBLICATION: Title pages of FH set listed below and reviews.

1 Ed II[a]	1-100	1875	Bot Zeitung 33(20):344. 1875.
2	101-200	1875	
3	201-300	1875	
4-5	301-500	1876	Grevillea 4(31):127. 1876 (Mar).
6-7	501-700	1876	
8-9	701-900	1876	Grevillea 5(35):128. 1877 (Mar).
10-11	901-1100	1876	
12-13	1101-1300	1878	Grevillea 6(40):159. 1878 (Jun).
14	1301-1400	1879	Grevillea 7(45):115. 1879 (Mar); Bot. Zeitung 37(4):64. 1879.
15-16	1401-1600	1881	Bot. Zeitung 39(22):359. 1881 (3 Jun).

Notes: The first several centuries were published in at least two editions. There are new species proposed by Saccardo with short descriptions such as No. 281. *Cercospora Cheiranthi* Sacc. no. 283. *Cercospora Vincetoxici* Sacc. no. 172. *Fenestelle phaeospora* Sacc. The *Index Alphabeticus Mycotheca Venetae Editae A. P. A. Saccardo. Cent. I-XI* was published in Michelia 1: 101-115. 1877.

I have not compared the several editions for uniformity. The listing above is taken from the FH copy. There are some hand corrections in the FH copy.

References: Bot. Kal. 1899. p. 120. TL-2/4: 1024. 1983.

FH, BPI, UPS, S, BM (list), HBG (partial).

MYRIANGIALES SELECTI EXSICCATI. Fasc. 1-11. Numbers 1-550. Dec. 1940 - July 1964. Sao Paulo, Brazil (Fasc. 1); Beltsville, MD (Fasc. 2-11).

Jenkins, Anna Eliza (1886-1972) and Bitancourt, Agesilau Antonio (1899-)

DATES OF PUBLICATION: Stevenson p. 206-216.

Fasc.	Numbers	Date
1	1-50	Dec 1940
2	51-100	Jun 6, 1947
3	101-150	Jun 6, 1947
4	151-200	Jun 6, 1947
5	201-250	Jun 6, 1947
6	251-300	Jun 6, 1947
7	301-350	1947
8	351-400	1947
9	401-450	1949 [Apr 1953]
10	451-500	1949 [1954]
11	501-550	1963 [Jul 1964]

References: TL-2/2: 435.

FH, BPI, CUP, UPS, NY.

MYXOGASTRES FENNICI EXSICCATI. Decades 1,2. 1924.

Hintikka, Toivo Juho (1888-1952).

DATES OF PUBLICATION: Title page and notes in Hedwigia 66:(118). 1925.

Decades	Numbers	Date
1-2	1-20	1924

Note: No new species were described or included.

MYXOMYCETES DE ROUMANIE. Ser. 1, Fasc. 1. Numbers 1-30. Jan. 1920. Ser. 2, Fasc. 1-3. Numbers 1-90. Oct. 1922. Ser. 3, fasc. 1-6. Numbers 1-126. Mar. 1924-Jan. 1926. Ser. 4, fasc. 1-8. Numbers 1-96. 1925. Bucarest.

Brândzǎ, Marcel Alex (1868-1934)

DATES OF PUBLICATION: As listed above, taken from TL-2/1:710.

Notes: FH set seems to be primarily edition or Series 3. Numbers include 1-132. Specimens are boxed, have printed title, label and printed fungus name. Locality and date are handwritten. See TL-2/1: 306.

FH

MYXOMYCETES EXSICCATI. Series 1-10. Numbers 1-200. 1907-July 1916. Suppl. 1-3. Hamburg, Germany.

Jaap, Otto (1864-1922)

DATES OF PUBLICATION: From FH exsiccatae records and Hedwigia.

Series	Number		Date received FH
1	1-20	Hedwigia Beibl. 47(4):(189). 1908 (Mai).	Feb. 11, 1909.
2	21-40	Hedwigia Beibl. 48(4):(194). 1909 (Apr).	Feb. 11, 1909.
3	41-60	Hedwigia Beibl. 49(1):(50). 1909 (Jul).	Feb. 11, 1909.
4	61-80	Hedwigia Beibl. 50(1):(47). 1910 (Apr).	Oct. 1912.
5	81-100	Hedwigia Beibl. 52(2):(151). 1912 (Jul).	Oct. 1912.
6	101-120	Hedwigia Beibl. 53(2):(168). 1913 (Feb).	Oct. 1912.
7	121-140	Hedwigia Beibl. 54(2):(124). 1913 (Nov).	Nov. 4, 1913.
8	141-160	Hedwigia Beibl. 55(1):(70). 1914 (Mai).	1914.
9,10	161-200	Hedwigia Beibl. 60(1):(92). 1918 (Feb).	Jan. 20, 1922.

Notes: Specimens are glued in boxes, labels are printed. Corrected labels were issued at various times.

References: Lindau and Sydow number 34872, Stevenson p. 202-205, TL-2/2:393.

FH, BPI (Ser. I, 1-20; II, 1-12, III, 1-15. nos. 2-200), S, HBG

NEW YORK FUNGI. Centuries 1-3, numbers 1-400. 1893-1896. Alove, N.Y. (cent. 1-2), Lincoln, Neb. (cent. 3).

Shear, Cornelius Lott (1865-1956)

DATES OF PUBLICATION: Stevenson p. 386-388.

Century	Numbers	Date
1	1-100	1893
2	101-200	1893
3	301-400	1896

Notes: New species were included but were described elsewhere. The set's particular strength is that Peck checked determinations of many Hymenomycetes. No specimens were issued with numbers 201-300. Century 3 contained the erroneously numbered specimens 301-400.

References: Lindau and Sydow number 24806, Bot. Kal. 1899. p. 120.

FH, BPI, S.

NORTH AMERICAN FUNGI. Series 1. Cent. 1-15. Numbers 1-1500. Sept. 6, 1878-Mar. 25, 1885. Newfield, N.J. Series II. Cent. 16-36. Numbers 1501-3600. Mar. 16, 1886-Feb. 1, 1898.

Ellis, Job Bicknell (1829-1905) and Everhart, Benjamin Matlack (1818-1904).

DATES OF PUBLICATION: Stevenson fully covers the history of this set.

Series I

Cent.	Number	Date	
1	1-100, 4 extra	Sep .6, 1878	Bot. Zeitung 37(18):295. 1879.
2	101-200, 7 extra	Apr 15, 1879	
3	201-300, 10 extra	Feb 11, 1880	Bot. Zeitung 38(14):240. 1880.
4	301-400, 10 extra	Apr 20, 1880	Bot. Zeitung 38(40):686. 1880.
5	401-500, 6 extra	Jan 28, 1881	Bot. Zeitung 39(24):391. 1881.
6	501-600, 11 extra	Mai 23, 1881	
7	601-700, 7 extra	Mai 23, 1881	
8	701-800, 4 extra	Apr 13, 1882	
9	801-900, 12 extra	Apr 13, 1882	Bot. Zeitung 40(50):897. 1882.
10	901-1000, 4 extra	Apr 26, 1883	Bot. Zeitung 41(39):644. 1883.
11	1001-1100, 20 extra	Apr 26, 1883	
12	1101-1200, 3 extra	Apr 15, 1884	
13	1201-1300, 13 extra	Apr 15, 1884	
14	1301-1400, 4 extra	Mar 25, 1885	
15	1401-1500, 16 extra	Mar 25, 1885	

Series II

Cent.	Number	Date
16	1501-1600, 7 extra	Mar 16, 1886
17	1601-1700, 1 extra	Mar 16, 1886
18	1701-1800, 6 extra	Mar 13, 1887
19	1801-1900, 15 extra	Mar 13, 1887
20	1901-2000, 6 extra	Mar 23, 1888
21	2001-2100, 2 extra	Mar 23, 1888
22	2101-2200, 2 extra	Mar 6, 1889
23	2201-2300, 10 extra	Mar 6, 1889
24	2301-2400, 5 extra	Feb 19, 1890

Cent.	Number	Date
25	2401-2500, 11 extra	Feb 19, 1890
26	2501-2600, 1 extra	Feb 21, 1891
27	2601-2700, 2 extra	Feb 21, 1891
28	2701-2800	Apr 30, 1892
29	2801-2900, 1 extra	Mar 2, 1893
30	2901-3000, 1 extra	Oct 21, 1893
31	3001-3100, 1 extra	Apr 18, 1894
32	3101-3200, 1 extra	Nov 26, 1894
33	3201-3300, 1 extra	Mar 25, 1895
34	3301-3400	Feb 3, 1896
35	3401-3500, 1 extra	Dec 16, 1896
36	3501-3600	Feb 1, 1898

Notes: The first series was edited by Ellis; the second by Ellis and Everhart.

References: TL-2/1:742, Bot. Kal. 1899. p. 119.

FH (several sets dist.), BPI, CUP, UPS (1-3400, 3501-3600), S, BM (list), NY, HBG (partial first series).

NORTH AMERICAN MYXOMYCETES. Edition I, Fasc. 1. Number 1-50. 1923. Edition II, Fasc. 2. Numbers 1-50. 1929.

Wann, Frank Burkett (1892-1954) and Muenscher, Walter Conrad (1891-1963).

DATES OF PUBLICATION: Stevenson p. 494-497.

Notes: There is some doubt as to whether Fasc. 2 of Edition II was issued.

References: TL 2/3:653. 1981. Stevenson p. 494-497.

FH (1-50), BPI (nos. 1-50), CUP.

NORTH AMERICAN UREDINALES. Century 1-35. Numbers 1-3500. Feb. 25, 1911-Jan. 5, 1926. Stockton, Kansas.

Bartholomew, Elam (1852-1934)

DATES OF PUBLICATION: Stevenson p. 33-49.

Century	Number	Date
1	1-100	Feb 25, 1911
2	101-200	Mar 28, 1911
3	201-300	Feb 15, 1912
4	301-400	Feb 22, 1912
5	401-500	Apr 30, 1912
6	501-600	Jan 30, 1913
7	601-700	Feb 22, 1913
8	701-800	Apr 15, 1913
9	801-900	Jan 10, 1914
10	901-1000	Feb 5, 1914
11	1001-1100	Jun 10, 1914
12	1101-1200	Jan 15, 1915
13	1201-1300	Feb 15, 1915

14	1301-1400	Mar 20, 1915
15	1401-1500	Jan 20, 1916
16	1501-1600	Feb 25, 1916
17	1601-1700	Mar 20, 1917
18	1701-1800	Dec 20, 1917
19	1801-1900	Jan 10, 1918
20	1901-2000	Nov 20, 1918
21	2001-2100	Dec 20, 1918
22	2101-2200	Dec 10, 1919
23	2201-2300	Jan 15, 1920
24	2301-2400	Feb 10, 1921
25	2401-2500	Mar 15, 1921
26	2501-2600	Dec 28, 1921
27	2601-2700	Feb 20, 1922
28	2701-2800	Nov 20, 1922
29	2801-2900	Jan 15, 1923
30	2901-3000	Nov 20, 1923
31	3001-3100	Dec 20, 1923
32	3101-3200	Dec 15, 1924
33	3201-3300	Jan 20, 1925
34	3301-3400	Nov 30, 1925
35	3401-3500	Jan 5, 1926

Notes: FH has several sets of this exsiccata, one which was extracted from Bartholomew's personal herbarium at FH. Apparently, labels correcting and updating nomenclature were periodically issued. The new labels were issued without date. In the first century, the following have corrected labels: 18, 22, 25, 26, 32, 47, 51, 62, 91.

References: TL-2/1:125.

FH (and dist.), BPI, CUP, UPS (dist.), S.

NORTH DAKOTA FUNGI. Fasc. 1-3. Numbers 1-60. Feb. 1908-March 1909. Fargo, N.D.

Seaver, Fred Jay (1877-1970) and Bergman, Herbert Floyd (1883-).

DATES OF PUBLICATION: Stevenson p. 370-371.

Fasc.	Numbers	Date
1	1-20	Feb 1908
2	21-40	Aug 1908
3	41-60	Mar 1909

Notes: Fascicle 1 was prepared by Seaver; Fascicles 2 and 3 were prepared by Bergman.

FH, BPI, CUP

OHIO FUNGI, with reprint of original description. Fasc. 1-10. Numbers 1-200. Nov. 1901-Jan. 1905. Columbus, OH.

Kellerman, William Ashbrook (1850-1908)

DATES OF PUBLICATION: Stevenson p. 225-229.

Fasc.	Number	Date
1	1-16	Nov 1901
2	17-42	Feb 1902
3	43-60	Mai 1902
4	61-80	Jun 1902
5	81-100	Oct 1902
6	101-120	Feb 1903
7	121-140	Mai 1903
8	141-160	Oct 1903
9	161-180	Mar 1904
10	181-200	Jan 1905

References: TL-2/2:517.

FH, BPI, CUP, S, PC (dist.), HBG

100 SPECIMENS OF BRITISH LEAF-FUNGI, COLLECTED AND ARRANGED BY M. C. COOKE. 1870. London.

Cooke, Mordecai Cubitt (1825-1914)

Notes: Hedwigia 9: 165 lists species. The set was advertised for sale by W. G. Schneider in Bot. Zeitung 33(20): 328. 1875.

References: TL-2/1:538.

PARASITSVAMPAR FINSKA KULTURVÄXTER. Fasc. 1. Numbers 1-49, ca. 1880. Mustiala.

Karsten, Peter Adolf (1834-1917).

Note: Reported from information sent by Teuvo Ahti.

References: TL-2/2: 503.

PARASITSVAMPAR PÅ FINSKA SKOGSTRÄD. Fasc. I-II. Nos. 1-43. ca. 1880. Mustiala.

Karsten, Peter Adolf (1834-1917)

Notes: The information above was supplied by Teuvo Ahti. He examined the Helsinki set and states that the labels are printed and that there are no localities.

References: TL-2/2: 503.

PARASITSVAMPAR PÅ LEFVANDE, I FINLAND ODLADE VÄXTER. Decade 1. Numbers 1-10. 1865. Åbo.

Karsten, Peter Adolf (1834-1917)

Note: No specimens have been seen. Teuvo Ahti provided the information which follows. Notes on ecology for parasitic fungi on living cultivated plants are written in Swedish. The text is printed and bound in booklet form.

References: Lindau and Sydow number 13591, Acta Soc. Pro Fauna et Flora Fennica 43:575, TL-2/2:502.

PARASIT-SVAMPAR PÅ LEFVANDE, I FINLAND ODLADE VÄXTER. Numbers 1-60. 1876. Mustiala.

Karsten, Peter Adolf (1834-1917)

Note: According to Teuvo Ahti, the title page and all labels are handwritten. It is perhaps a unique set and contains none of the specimens issued in *Parasitsvampar På Lefvande Odlade Växter* (1865) or *Parasitsvampar På Finska Kulturväxter*.

References: TL-2/2: 503.

PHACIDIALES EXSICCATI. Decades 1- Number 1- 1979- . Cambridge, Mass. (in progress).

Sherwood, Martha Allen (1948-).

Dec.	Numbers	Date
1-3	1-30	Jul 1979

PHYCOMYCETEN UND PROTOMYCETEN. Fasc. 1-9. Numbers 1-350. 1898-1913. Berlin.

Sydow, Paul (1851-1925)

DATES OF PUBLICATION: Stevenson p. 435-437.

Fasc.	Number	Date
1	1-50	1898
2	51-100	Jul 1899
3	101-150	1900
4	151-200	1902
5	201-250	1905
6	251-275	1911
7	276-300	Nov 1912
8	301-325	Dec 1913
9	326-350	1916

Note: No new species were described in the set.

References: Lindau and Sydow number 13591.

FH, UPS, S, BM (list), PC, HBG

PHYTOPATHOLOGISCHES HERBARIUM. Material vorwiegend aus Hessen-Nassau Stammend.

Schulz, Hermann (1882-1970).

Note: Known only from Weigel's comments (Herbarium 1:262. 1912) and comments in Hedwigia Beibl. 54(1): (59). 1913. The set was said to be composed of 5 series as follows:

I. Parasitic fungi.
II-III. Insects.
IV. Frost and hail damage.
V. Photographs of teratological formations.

PILZE SCHESIENS. 650 numbers.

Schroeter, Joseph (1837-1894)

Notes: I have not examined this set. Urban (p. 281) records ca. 650 numbers.

References: Lindau and Sydow number 39047. Listed in Sałata (Grzyby [Mycota] tom VI). Bot. Kal. 1899. p. 120.

S, C (dist.).

PLANTAE CRYPTOGAMAE LINNAEAE, QUAS IN LOCIS EARUM NATALIBUS COLLEGIT ET EXSICCAVIT FRIDERICEES EHRHART. Decades 1-32. Numbers 1-320. 1785-1795. Hannoverae.

Ehrhart, Jacob Friedrich (1742-1795)

DATES OF PUBLICATION: See Sayre p. 19.

Notes: Fungi are found in Decades 6 and 10-16 and are as follows: no. 35. no specimen at UPS, 60. *Sphaeria nitida* Weig., 100. *Mucor Erysiphe* Linn., 110. *Hydnum auriscalpium* Linn., 120. *Cyathus striatus* Willd., 130. *Peziza carpinea* Ehrh.; 140. *Clavaria ophioglossoides* Linn., 150. *Clavaria Hypoxylon* Linn., 160. *Sphaeria ophioglossoides* Ehrh.

References: Lindau and Sydow 7672. TL-2/1: 731.

PLANTAE CRYPTOGAMICAE HELVETICAE, QUAS IN LOCIS EARUM NATALIBUS COLLEGIT ET EXSICCAVIT J. C. SCHLEICHER. Cent. 1-5. Numbers 1-500. 1805-1807. Bex.

Schleicher, Johann Christoff (1786-1834)

DATES OF PUBLICATION: Sayre p. 43.

Century	Numbers	Date
1	1-100	1805
2	1-100	Nov 1805
3	1-100	Nov 1805
4	1-100	Jan 1806
5	1-100	Jan-Jun 1807

Note: The included fungi are listed below as they appeared in J. Bot. Schrader volumes 1 and 2.

Neues. J. Bot. 1(1): 178.
Cent. 1.
66. *Tremella arborea* Huds; 68. *Sphaeria fusca* Pers., 69. *S. disciformis* Pers., 70. *S. stigma* Hoffm., 71. *S. typhina* Pers., 72. *S. nitida* Pers., 73. *S. ulmi* S., 74. *Hysterium pini* Schrad., 75. *Xyloma acerinum* Pers., 76. *Arcyria punicea* Pers., 77. *Mucor Erysiphe* L., 78. *Aecidium cornutum* Pers., 79. *A. crassum* ejusd., 80. *A. tussilaginis* Gmel., 81. *A. Berberidis* Gmel., 82. *A. euphorbiae* Gmel., 83. *Uredo farinosa* Pers., 84. *U. rubi-idaei* Pers., 85. *U. tussilaginis* Pers., 86. *U. scutellata* Pers., 87. *U. appendiculata* Pers., 88. *U. anemones* Pers., 89. *Puccinia juniperi* Pers., 90. *P. mucronata* Pers., 91. *Agaricus stipticus* Bull., 92. *Meruleus tremellosus* Schrad., 93. *Boletus abietinus* Dicks., 96. *Thaelacphora ferruginea* Pers., 97. *T. caerulea* Schrad., 98. *T. mesenterica* Pers., 99. *Erineum acerinum* ejusd., 100. *E. vitis* Schrad.

Neues J. Bot. 1(2): 195-200.
Cent. 2
78. *Sphaeria clavata* Hoffm., 79. *S. poronia* Pers., 80. *S. spinosa* Pers., 81. *S. spermoides* Pers., 82. *Hysterium Berberidis* Pers., 83. *Xyloma populinum* Pers., 84. *X. Ilicis* S., 85. *Naemaspora populina* Pers., 86. *Sclerotium Fraxine* Pers., 87. *Lycogala miniata* Pers., 88. *Scleroderma cervinum* Pers., 89. *Cribraria purpurea* Schrad., 90. *Aecidium rumicis* Pers., 91. *Uredo alchemillae* Pers., 92. *U. caricis* S., 93. *U. euphorbiae* S., 94. *U. candida* S., 95. *Agaricus floccopus* Schaeff., 96. *Hydnum obtusum* Schrad., 97. *Thelephora laemis* Pers., 98. *Clavaria pistillaris* L.

Cent. 3
80. *Sphaeria fragiformis* Pers., 81. *S. verrucaeformis* Pers., 82. *S. Berberidis* Pers., 83. *S. maxima* Web., 84. *Hysterium conigerum* Pers., 85. *H. fraxini* Pers., 86. *Xyloma salicinum* Pers., 87. *X. hysterioides* Pers., 88. *Sclerotium Coryle* Pers., 89. *S. Heraclei* S., 90. *Spumaria mucilago* Pers., 91. *Aecidium tragopogi* Pers., 92. *A. sempervivi* S., 93. *Uredo miniata* Pers., 94. *U. violarum* S., 95. *U. cyani* S., 96. *Agaricus integer* L., 97. *Hydnum parasiticum* L., 98. *Thelophora cruenta* Pers., 99. *Stilbum nigrum* Schrad.

Neues J. Bot. 1(3): 197.
Cent. 4
62. *Hysterium pulicare* P., 63. *H. ancupariae* S., 64. *Xyloma punctatum* P., 65. *X. stellare* P., 66. *X. alneum* P., 67. *Sclerotium Erysiphe* τ *quernea* S., 68. *S. Erysiphe* δ (?) *alnea* S., 69. *S. durum* Pers., 70. *Lycoperdon molle* P., 71. *Trichia ovata* P., 72. *Aecidium urticae* S., 73. *A. chamae-Mespili* S., 74. *A. ariae* S., 75. *Uredo geranii* S., 76. *U. Rubi fruticosi* P., 77. *U. viciae-fabae* P., 78. *Puccinia Potentellae* P., 79. *P. menthae* S., 80. *P. Hedysari-obscuri* S., 81. *Meruleus crispus* Pers., 82. *Clavaria mucida* P., 83. *C. grossa* P., 84. *Morchella esculenta* β P., 85. *Tremella coriacea* S., 86. *Peziza nigrella* Pers., 87. *P. sanguinea* P., 88. *P. citrina* P., 89. *P. ribesia* P., 90. *P. pinastri* P., 91. *Erineum fagineum* P., 92. *E. Inglantis* S., 93. *E. Tiliae* P., 94. *E. Betulae* P., 95. *Dematium Pinastri* S.

Neues J. Bot. 2: 172. 1807.
Cent. 5
86. *Hysterium Cotini* S., 87. *Xyloma aurantiacum* S., 88. *Naemospora crocea* Pers., 89. *Tulostoma bumale* Pers., 90. *Aecidium Lonicerae* S., 91. *A. Thesii* S., 92. *Uredo linearis* Pers., 93. *U. populina* Pers., 94. *U. ribesia* Pers., 95. *Agaricus applicatus* Batsch , 96. *Hydnum paradoxum* Schrad., 97. *Thelephora Pini* S., 98. *Peziza stercorea* Pers., 99. *P. herbarum* Pers., 100. *Dematium herbarum* Pers.

References: Lindau and Sydow number 23963. Sayre p. 19: 43. Bot. Kal. p. 117.

BPI (#60-99)

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Libert, Marie Anne (1782-1865)

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3	201-300	1834	1837
4	301-400	1837	1837/1838

Notes: See Saccardo, P. A., Malpighia.1: 211. 188b.
See also Reliquiae Libertianae. Included fungi follow:

Fasc. 1. 1830.

19. *Agaricus applicatus* Batsch., 20. *Thelephora laevis* Pers., 21. *Thelephora papillosa* Fr., 22. *Thelephora coerulea* Schrad., 23. *Clavaria pratensis* Pers., 24. *Desmazierella acicola* Libert; 25. *Peziza nidulus* Schm. et Kunze, 26. *Peziza chavetiae* N. [with latin description], 27. *Peziza herbarum* Pers., 28. *Peziza cerastiorum* Wallr.,
29. *Peziza neglecta* N. [with latin description], 30. *Stictis lecanora* Schmidt et Kunze, 31. *Dacryomyces urticae* Nees, 32. *Acrospermum compressum* Tode, 33. *Acrospermum graminium* N. [with latin description], 34. *Sclerotium compactum* De Cand., 35. *Sclerotium durum* Pers., 36. *Sclerotium Tulipae* N. [with latin description]; 37. *Sclerotium punctum* N. [with latin description], 38. *Sphaeria ceratosperma* Tode, 39. *Sphaeria vaccinii* Sowerb., 40. *Sphaeria fimbriata* Pers., 41. *Sphaeria millepunctata* Spreng., 42. *Sphaeria lirella* Moug. et Nestl., 43. *Sphaeria asteromorpha* N. [with latin description], 44. *Sphaeria phaecomes* Rebent., 45. *Eustegia ilicis* Chev., 46. *Ascoxyta quercina* N. [with latin description], 47. *Ascoxyta vaccinii* N. [with latin description], 48. *Ascoxyta fraxini* N. [with latin description], 49. *Ascoxyta aegopodii* N. [with latin description], 50. *Ascoxyta rosarum* N. [with latin description], 51. *Ascoxyta herbaclei* N. [with latin description], 52. *Ascoxyta Ulmi* N. [with latin description], 53. *Ascoxyta ribis* N. [with latin description], 54. *Ascoxyta aceris* N. [with latin description], 55. *Ascoxyta virgaureae* N. [with latin description], 56. *Ascoxyta convolvuli* N. [with latin description], 57. *Ascoxyta chelidonii* N. [with latin description], 58. *Ascoxyta corni* N. [with latin description], 59. *Ascoxyta pisi* N. [with latin description], 60. *Asteroma padi* De Cand., 61. *Asteroma rosae* Libert, 62. *Xeilaria urticae* N. [with latin description but apparently a synonym of

188. *Helmenthosporium pyrorum* [no author, description], 189. *Erineum fagineum* Link, 190. *Erineum roseum* Schulz , 191. *Erineum puntiforme* [no author, description]; 192. *Caeoma scrofulariatum* Link, 193. *Puccinia scrofulariae* [no author, description], 194. *Sporisorium colchici* [no author, description], 195. *Sporisorium ranunculi* [no author, description], 196. *Phragmotrichum chailletii* Kunz.

Fasc. 3. 1884.

220. *Agaricus arvalis* Fr., 221. *Agaricus variabilis* Pers., 222. *Merulius tremellosus* Schrad., 223. *Polyporus cellaris* [no author, description], 224. *Thelephora quercina* Pers., 225. *Peziza patula* Pers., 226. *Peziza aspidii* [no author, description], 227. *Peziza anomala* Pers., 228. *Peziza firma* Pers., 229. *Peziza Hederae* [*Sphaeria craterium* De Cand., [no author, description], 230. *Peziza caricina* [no author, description], 231. *Patellaria rubi* [no author, description], 232. *Stictis circinata* [no author, description], 233. *Stictis seriata* [no author, description], 234. *Tremella indecorata* Sommerf., 235. *Agyrium nitidum* [no author, description], 236. *Hymenula equiseti* [no author, description], 237. *Sclerotium sphaerlaeforme* [no author, description], 238. *Sclerotium cepae* [no author, description], 239. *Sclerotium areolatum* Fr., 240. *Rhizoctonia Brassicarum* [no author, description], 241. *Sphaeria carneo-alba* [no author, description], 242. *Sphaeria coccinea* Tode, 243. *Sphaeria filicina* Fr., 244. *Sphaeria complanata* Tode, 245. *Sphaeria capreae* De Cand., 246. *Sphaeria festucae* [no author, description], 247. *Ascochyta roborum* [no author, description], 248. *Ascochyta caulium* [no author, description], 249. *Ascochyta sedi* [no author, description], 250. *Ascochyta grossulariae* [no author, description], 251. *Ascochyta menyanthis* [no author, description], 252. *Ascochyta petroselini*], 253. *Ascochyta Lysimachie* [no author, description], 254. *Cheilaria Heraclei* [no author, description], 255. *Cheilaria aceris* [no author, description], 256. *Leptothyrium carpini* [no author, description], 257. *Leptothyrium populi* [no author, description], 258. *Leptothyrium ribis* [no author, description], 259. *Leptostroma longissimum* [no author, description], 260. *Leptostroma juncinum* Fr., 261. *Naemaspora crocea* Pers., 262. *Naemaspora incarnata* Kunz., 263. *Sphaeronaema Rhinanthi* [*Sphaeria Rhinanthi* Sommerf.], 264. *Sphaeronaema mercurialis* [no author, description], 265. *Cytispora ferruginea* Desmaz!, 266. *Cytispora pinastri* Fr., 267. *Dothidea potentillae* Fr., 268. *Phacidium pusillum* [no author, description], 269. a. *Phacidium patella α alpestre* Fr., 269. b. *Phadidium patella compestre* Fr.,270. *Hysterium degenerans* Fr., 271. *Hysterium punctiforme* Fr., 272. *Aylographum* n., *Aylographum hederae* [no author, description], 273. *Aylographum epilobii* [no author, description], 274. *Aylographum juncinum* [no author, description], 275. *Aylographum filicinum* [no author, description], 276. *Diderma liceoides* Fr., 277. *Trichia nitens* Pers., 278. *Erysibe myrtillina* Fr.; 279. *Erysibe Potentillae* [no author, description], 280. *Perisporium Brassicae* [no author, description], 281. *Illosporium coccineum* Fr., 282. *Illosporium puniceum* [no author, description], 283. *Goniosporium puccinioides* Link, 284. *Dematium graminum* [no author, description], 285. *Oidium radiosum* [no author, description], 286. *Psilonia festucae* [no author, description], 287. *Psilonia stipilata* [Tubercularia ciliata De Cand.], 288. *Xenodochus carbonarius* Schlecht., 289. *Erineum purpurascens* Link, 290. *Erineum padi* Rebent., 291. *Caeoma Hellebori* [*Uredo ranunculacearum* var. De Cand.] 292. *Caeoma minutum* [no author, description], 293. *Puccinia circaeae* Pers., 294. *Puccinia asparagi* De Cand., 295. *Stilbospora pyriformis* Hoffm., 296. *Tubercularia pinastri* [no author, description].

Fasc. 4. 1837.

322. *Clavaria paludicola* [no author, description], 323. *Thelephora rubi* [no author, description], 324. *Peziza trifoliorum* [*Ascobolus Trifolii* Fr.] 325. *Peziza vincae* [no author, description], 326. *Peziza sclerotiorum* [no

Rhytisma Urticae Fr.], 63. *Xeilaria agrostidis* N. [with latin description], 64. *Cytispora foliicola* N. [with latin description], 65. *Dothidea robertiana* Fr., 66. *Dothidea alchemillae* N. [with latin description], 67. *Rhytisma acerinum* Fr., 68. *Rhytisma Bistortae* N. [with latin description], 69. *Phacidium ranunculi* N. [with latin description], 70. *Phacidium lacerum* Fr., 71. *Hysterium pulicare* Pers., 72. *Hysterium foliicolum* Fr., 73. *Hysterium apiculatum* Fr., 74. *Hysterium petiolare* A.S., 75. *Leptostroma luzulae* N. [with latin description], 76. *Diderma vernicosum* Pers., 77. *Illosorium roseum* Fr., 78. *Trichothecium roseum* Link, 79. *Camptoum curvatum* Link, 80. *Erysibe pannosa* Link, 81. *Erysibe penicillata* Link, 82. *Erysibe orbicularis* Link, 83. *Oidium fructigenus* Link, 84. *Erineum aucupabiae* Kunze, 85. *Erineum nervisequum* Kunze *Erineum nervisequum purpureum* N. [no description], 86. *Caeoma alliorum* Link, 87. *Caeoma bistortae* N. [with latin description], 88. *Caeoma bistortarum* Link, 89. *Caeoma padi* N. [with latin description], 90. *Caeoma crassatum* Link, 91. *Puccinia bistortae* De Cand., 92. *Puccinia senecionis* N. [with latin description], 93. *Puccinia seorodoniae* Link, 94. *Puccinia Leizulae* N. [with latin description], 95. *Exosporium rubi* Nees., 96. *Inoconia micheli* Libert.

Fasc. 2. 1832.

117. *Calicium curtum* Turn. et Borr., 118. *Agaricus cyathiformis* Fr., 119. *Agaricus graminum* [without author, with latin description], 120. *Agaricus stypticus* Bull., 121. *Thelephora tabacina* Sowerb., 122. *Thelephora cinnamomea* Pers., 123. *Geoglossum viride* Pers., 124. *Peziza calycina* Schum., 125. *Peziza pulverulenta* [no author, latin description], 126. *Peziza albo-violascens* Fr., 127. *Peziza aurelia* Pers., 128. *Peziza millepunctata* [no author, latin description], 129. *Tympanis conspersa* Fr., 130. *Cenangium cerasi* Fr., 131. *Cenangium padi* Fr., 132. *Stictis sesleriae* [no author, with latin description], 133. *Stictis Luzulae* [no author, with description], 134. *Exidia recesa* Fr., 135. *Dacryomyces poae* [no author, description], 136. *Hymenula vulgaris* Fr., 137. *Hymenula rubella* Fr., 138. *Sclerotium eurotioides* [no author, description], 139. *Sclerotium fibrillosum* [no author, description], 140. *Sclerotium pezizaeforme* Schum., 141. *Rhizoctonia muscorum* Fr., 142. *Spermoedia clavus* Fr., 143. *Sphaeria graminis* Pers., 144. *Sphaeria coryli* Batsch, 145. *Sphaeria gregaria* [no author, description], 146. *Sphaeria aquifolii* Fr., 147. *Sphaeria rostellata* Fr., 148. *Sphaeria petiolorum* Schw., 149. *Sphaeria padicola* [no author, description], 150. *Ascochyta strobilina* [no author, description], 151. *Ascochyta hippocastani* [no author, description], 152. *Ascochyta oxyacanthae* [(Kunze) Libert], 153. *Ascochyta padi* [no author, description], 154. *Ascochyta aesculi* [no author, description], 155. *Ascochyta fragariae* [no author, description], 156. *Ascochyta cytisi* [no author, description], 157. *Ascochyta calamagrostidis* [no author, description], 158. *Ascochyta dianthi* [no author, description], 159. *Ascochyta anemones* [no author, description], 160. *Pilidium carbonaceum* [? a synonym of *Phacidium carbonaceum* Fr.], 161. *Leptothyrium tremulae* [no author, description], 162. *Leptothyrium fragariae* [no author, description], 163. *Leptothyrium Betulae* [no author, description], 164. *Leptothyrium juglandis* [*Xyloma Juglandis* De Cand.], 165. *Actinothyrium graminis* Kunze, 166. *Leptostroma vulgare* Fr., 167. *Sphaeronema anemones* [*Sphaeria anemones* De Cand.], 168. *Cytispora aucupariae* [no author, description], 169. *Cytispora chrysosperma* Fr., 170. *Cytispora tumida* [*Sphaeria tumida* Pers.], 171. *Dothidea Betulina* Fr., 172. *Dothidea stellariae* [no author, description], 173. *Dothidea veronicae* [no author, description], 174. *Rhytisma salicinum* Fr., 175. *Phacidium coronatum* Fr., 176. *Phacidium medicagnis* [no author, description], 177. *Hysterium rubi* Pers., 178. *Hysterium melaleucum* Fr., 179. *Spumaria alba* De Cand., 180. *Didymium michelii* [no author, description], 181. *Cenococcum geophilum* Fr., 182. *Erysibe graminum* Link, 183. *Erysibe galeopsidis* Link, 184. *Coniosporium violae* [no author, description], 185. *Illosporium fagineum* [no author, description], 186. *Sporotrichum olivaceum* Pers., 187. *Sporotrichum fallax* [no author, description],

author, description], 327. *Peziza pulchella* Pers., 328. *Peziza aerugenosa* Pers., 329. *Peziza persoonii* Fr., 330. *Cenangium ribis* Fr., 331. *Cyphilla faginea* [no author, description], 332. *Exidia glandulosa* Fr., 333. *Dacromyces hyalinus* [no author, description], 334. *Sclerotium mycetospora* Nees!, 335. *Sclerotium tectum* Fr., 336. *Sclerotium betuli* [no author, description], 337. *Sphaerobolus stellatus* Tod., 338. *Sphaeria cubicularis* Fr., 339. *Sphaeria sorbi* Schmidt, 340. *Sphaeria ruborum* [no author, description], 341. *Sphaeria citrina* Pers., 342. *Sphaeria aspidiorum* [no author, description], 343. *Sphaeria stipitata* [no author, description], 344. *Sphaeria chaetomium* [no author, description], 345. *Discosia* N., *Discosia faginea* [no author, description, 346. *Discosia strobilina* [no author, description], 347. *Vermicularia hispida* Tod., 348. *Vermicularia graminum* [*Peziza strigosa* Fr. [no author, description] 349. *Vermicularia strigosa* [*Peziza strigosa* β *hysteriformis* Fr.], 350.*Vermiculariaminuta* [*Exosporium minutum* Link], 351. *Ascochyta aquifolii* [*Xyloma multivalve* Dec.], 352. *Ascochyta rubra* [*Xyloma rubru* Pers.], 353. *Ascochyta crataegi* [*Septoria Oxyacanthae*], 354. *Ascochyta stipata* [no author, description], 355. *Ascochyta effersa* [no author, description], 356. *Ascochyta viciai* [no author, description], 357. *Ascochyta robiniae* [no author, description], 358. *Ascochyta quercicola* [no author, description], 359. *Pilidium disseminatum* [no author, description], 360. *Leptothyrium mezerei* [no author, description], 361. *Leptothyrium alneum* [*Xyloma alneum* Pers.], 362. *Leptothyrium veronicae* [no author, description], 363. *Libertella Betulina* Desm., 364. *Libertella alba* [no author, description], 365. *Dothidea pucciniodes* Fr., 366. *Dothidea ambiens* [no author, description], 367. *Phacidium illicis* [no author, description], 368. *Phacidium dentatum* Schmidt, 369. *Phacidium arctii* [no author, description], 370. *Hysterium maculare* Fr., 371. *Hysterium seriatum* [no author, description], 372. *Aylographum Luzulae* [no author, description], 373. *Aylographum festucae* [no author, description], 374. *Leptostroma Hysterioides* Fr., 375. *Leptostroma maculans* [no author, description], 376. *Diderma valvatum* Fr., 377. *Perichaena strobilina* Fr., 378. *Perichaena depressa* [no author, description], 379.
380. *Myrothecium gramineum* [no author, description], 381. *Erysibe fuliginea* Link, 382. *Coniosporium arnicae*, 383. *Illosporium carneum* Fr., 384. *Arthrinium sporophleum* Kunze et Schmidt, 385. *Oidium tritici* [no author, description], 386. *Psilonia Luzulae* [no author, description], 387. *Psilonia nivea* Fr., 388. *Naemaspora microspora* Desm., 389. *Naemaspora grisea* Pers., 390. *Stilbospora macrosperma* Pers., 391. *Didymosporium elevatum* Link, 392. *Torula graminis* Fr., 393. *Puccinia virgae aureae*, 394. *Roestelia cancellata* Rebent., 395. *Caeoma Luzulae* [no author, description], 396. *Erineum clandestinum* Link.

References: Lindau and Sydow number 15371. Sayre p. 33. TL-2/3:6.

FH, S, HBG (partial).

PLANTAE CRYPTOGAMICAE QUAS IN MAGNO DUCATU BADENSI COLLEGERUNT FRIDERIC. GOTTHARD KNEIFF ET EMAN. FRIDERIC. HARTMANN. Fasc. I-IV. Numbers 1-200. 1828-1830. Argentorati [Strasbourg].

Kneiff, Friedrich Gotthard (1785-1832)
Hartmann, Emanuel Friedrich (1770-)

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1	1-50	1828
2	51-100	1830
3	101-150	1830
4	151-200	1830

Notes: Included fungi are as follows:

Fasc. 1. 1828.

9. *Caeoma Cichoracearum* Schlechtendal (syn. *Aecidium tragopogi* Pers.); 10. *Aecidium Cichoracearum* Decand.; *Caeoma longissimum* Schlechtendal (syn. *Uredo longissima* Sowerb.); 11. *Dacryomyces Urticae* Fr. (syn. *Tremella Urticae* Pers.); 12. *Tulostoma brumale* Pers. (syn. *Lycoperdon pedunculatum* Linn.); 13. *Alphitomorpha depressa* Wallr. (syn. *Erysibe depressa);* 14. *Alphitomorpha bicornis* β (syn. *Erysibe aceris* Decand.); 15. *Alphitomorpha penicillata, Alni* Wallroth. (syn. *Erysibe Alni* Decand.); 16. *Alphitomorpha fumosa* Wallroth. in Litter. [no description]; 17. *Alphitomorpha obtusata* Schlecht.; 18. *Hydnum auriscalpium* Linn.; 19. *Cenangium quercinum* Fr. (syn. *Hysterium quercinum* Pers., *Triblidium quercinum* Pers.); 20. *Sclerotium roseum* Kneiff (nov. spec.) [no description]; 21. *Rhytisma salicinum* Fr. (syn. *Xyloma salicinum* Pers., *Xyloma leucocreas* Decand.); 22. *Hysterium scirpinum* Fr. (*Hypoderma scirpinum* Decand., *Sphaeria leptostroma* Ehrenb.); 23. *Sphaeria hypoxylon* Ehrh. (syn. *Clavaria hypoxylon* Linn., *Sphaeria cornuta* Hoffm.); 24. *Sphaeria punctata* Sowerb. (syn. *Sphaeria poronia* Pers., *Peziza punctata* Linn.); 25. *Sphaeria mammaeformis* Pers. (syn. *Sphaeria papillosa* Sowerb., *Hypoxylon globulare* Bull.); 26. *Sphaeria Doliolum* Pers.; 27. *Leptostroma Scirpinum* Fr. (syn. *Leptostroma Xylomoides* Fr.).

Fasc. 2. 1830.

54. *Caeoma elegans* Schlechtendal (syn. *Aecidium Convallariae* Schum.); 55. *Alphitomorpha comata* Wallr.; 56. *Alphitomorpha guttata coryli* Wallr.; 57. *Thelephora purpurea* Pers.; 58. *Peziza Bolaris* Batsch.; 59. *Peziza Persoonii* Fr.; 60. *Exidia Auricula Judae* Fr. (syn. *Tremella Auricula Judae*); 61. *Sclerotium varium* Pers.; 62. *Rhytisma acerinum pseudoplatani* Fr. (syn. *Xyloma acerinum* Pers.); 63. *Hysterium graphicum* Fr. (syn. *Hysterium contortum* Dittmar); 64. *Dothidea ulmi* Fr. (syn. *Sphaeria ulmi* Duval.); 65. *Dothidea fulva* Fr. (syn. *Sphaeria ochracea* Wahl.); 66. *Sphaeria digitata* Ehrh.; 67. *Sphaeria polymorpha* Pers.; 68. *Sphaeria rubricosa* Fr.; 69. *Sphaeria scabrosa* Decand. (syn. *Sphaeria podoides* Pers.); 70. *Sphaeria rimosa* Alb. et Schw.; 71. *Sphaeria bombarda* Batsch.

Fasc. 3. 1830.

104. *Caeoma Alliatum* Link in Willd. (syn. *Aecidium Alli ursini* Pers.); 105. *Septoria Ulmi* Kunze (syn. *Fusidium septatum* Kunze et Schm.); 106. *Stilbospora pyriformis* Hoffm. (syn. *Stilbospora ovata* Pers.); 107.*Tubercularia minor* Link in Willd. (syn. *Tubercularia Castaneae* Pers.); 108. *Helmisporium velutinum* Link (syn. *Dematium ciliare* Pers.); 109. *Antennaria cellaris* Fr. (syn. *Racodium cellare* Pers.); 110. *Conoplea hispidula* Pers.; 111. *Nidularia striata* Bull. (syn. *Cyathus striatus* Pers.); 112. *Agaricus stipticus* (syn. *Agaricus semipetiolatus* Schaeff.); 113. *Peziza nidulus* Schmidt et Kunze; 114. *Bulgaria inquinans* Fr.; 115. *Stictis Lecanora* Fr. (syn. *Peziza Lecanora* Schmidt et Kunze); 116. *Sclerotium areolatum* Fr.; 117. *Dothidea umbilicata* Fr. (syn. *Xyloma umbilicatum* Pers.); 118. *Dothidea Chaetomium* Fr. (syn. *Exosporium Rubi* Nees.); 119. *Sphaeria multiformis* Fr. (syn. *Sphaeria rubiformis* Pers.); 120. *Sphaeria bullata* Ehrh.; 121. *Sphaeria cinnabarina* Fr. (syn. *Sphaeria decolorans* Pers.); 122. *Sphaeria elongata* Fr.; 123. *Sphaeria rostrata* Fr.; 124. *Phoma saligna* Fr. (syn. *Xyloma salignum* Pers.).

Fasc. 4. 1830.

154. *Caeoma cylindricum* Schlechtend. (syn. *Uredo populina* α. Pers.); 155. *Puccinia striola* Schlechtend. (syn. *Uredo striola* v. Strauss); 156. *Coryneum pulvinatum* Kunze; 157. *Exosporium Tiliae* Nees; 158. *Alphitomorpha macularis* α *Humuli* Wallr.; 159. *Alphitomorpha communis* var. *Ranunculacearum* Wallr.; 160. *Alphitomorpha lamprocarpa* β. *Galeopsides* Wallr.; 161. *Alphitomorpha depressa* β *Artemisiae* Wallr.; 162. *Alphitomorpha guttata* β *fraxini* Wallr.; 163. *Polythrincium Trifolii* Schm. et Kunze; 164. *Thelephora hirsuta* Willd.; 165. *Peziza herbarum* Pers.; 166. *Sclerotium populinum* Pers.; 167. *Hysterium pulicare* Pers.; 168. *Dothidea Anemones* Fr.; 169. *Sphaeria stigma* Pers.; 170. *Sphaeria Berberides* Pers.; 171. *Sphaeria Graminis* Pers.; 172. *Sphaeria fimbriata* Pers.; 173. *Sphaeria ceuthocarpa* Fr. (syn. *Xyloma populinum* Pers.)

References: Sayre p. 30, TL-2/2:574.

FH

PLANTAE URUGUAYENSES EXSICCATAE. Centuries 1-27. Numbers 1-2700. 1924- . Montevideo, Uruguay.

Herter, Wilhelm Gustav Franz [Guillermo] (1884-1958)

Dates of Publication: From Stevenson p. 185-192.

Century	Numbers		Dates
1	1-100		1924
2	101-200		
3	201-300		
4	301-400		
5	401-500		
6	501-600		
7	601-700	[no fungi but Stevenson says 667 is a fungus]	
8	701-800		
9	801-900		
10	901-1000		
11	1001-1100	[no fungi]	
12	1101-1200	[no fungi]	
13	1201-1300		
14	1301-1400	[no fungi]	
15	1401-1500		
16	1501-1600		
17	1601-1700		
18	1701-1800		
19	1801-1900		
20	1901-2000		
21	2001-2100		
22	2101-2200		
23	2201-2300		
24	2301-2400		
25	2401-2500		
26	2501-2600		
27	2601-2700		

Notes: Stevenson reported at length upon this set. He pointed out that there were many irregularities in it from the method of labeling to the listing of contents, and the inclusion of extra numbers and omission of others.

References: TL-2/2: 176.

HBG

PLANTARUM CRYPTOGAMICARUM NORVEGICARUM. Cent. 1-3. Numbers 1-200. 1826-1830. Christianiae.

Sommerfelt, Søren Christian (1794-1838)

DATES OF PUBLICATION: From Sayre p. 49

Century	Fascicle	Number	Date
1	1	1-50	1826
	2	51-100	
2	3	101-150	1830
	4	151-200	

Notes: The set includes the following numbers:

86. *Erineum acerinum* Pers.; 87. *Erineum purpureum* Fries; 88.*Uredo majanthae* Pers.; 89. *Licea strobilina* Alb. et Schw.; 90. *Dothidea fulva* Fries; 91. *Sphaeria Stigma* Pers.; 92. *Sphaeria favacea* Fries; 93. *Sphaeria Sorbi* Fries; 94. *Sphaeria sangvinea* Pers.; 95. *Hysterium pulicare* Pers.; 96. *Thelephora comedens* NE.; 97. *Peziza fascicularis* Fries; 98. *Peziza Eqvina* Muell. - *stercorea* [sic] Pers.; 99. *Peziza bicolor* Fries; 100. *Peziza clandestina* Fries.

175. *Aecidium Tussilaginis* Pers.; 176. *Aecidium columellatum* Schum.; 177. *Puccinia ribis* DC.; 178. *Phracmotrichum Chailleti*; 179. *Circinotrichum rufum* Somf.; 180. *Rhytisma salicinum* Fries; 181. *Erysiphe bicornis* Fries; 182. *Erysiphe guttata* Fries; *A. Coryli B. Fraxini*; 183. *Sclerotium vestitum* NE., *Acinula candicans* Fries; 184. *Exidia spiculosa* Pers.; 185. *Excidia lobata* Somf.; 186. *Thelephora tabacina* Fries; 187. *Stictis pallida* Pers.; 188. *Peziza clavata* Fries; 189. [no label]; 190. *Cenangium fuliginosum* Fries; 191. *Tympanis alnea* Fries, *Peziza alnea* Pers.; 192. *Hysterium aggregatum* DC.; 193. *Sphaeria multiformis* Fries; 194. *Sphaeria fusca* Pers.; 195. *Sphaeria disciformis* Fries; 196. *Sphaeria vibratilis* Fries; 197. *Sphaeria setacea* Fries; 198. *Sphaeria xantholeuca* Fries; 199. *Sphaeria complanata* Fries; 200. *Sphaeria inquinans* Fries.

References: Lindau and Sydow number 25358; Sayre p. 49.

FH, UPS, S (86-100).

PLANTES CRYPTOGAMES DU NORD DE LA FRANCE. Ed. 1. Fasc. 1-44. Numbers 1-2200. 1825-1851. Ed. 2. Ser. 1. Fasc. 1-37. Numbers 1-1850. 1836-1851. Ed. 2. Ser. 2 (or Series 3, or Ed. 3). Fasc. 1-16. Numbers 1-800. 1853-1860. Lille.

Desmazières, Jean Baptiste Henri Joseph (1786-1862)

DATES OF PUBLICATION: Sayre p. 11, TL-2/1:630. Lindau and Sydow number 6923.

Edition 1

Fasc.	Numbers	Date
1	1-50	Jan. 1825

2	51-100	1825
3	101-150	1826
4	151-200	1826
5	201-250	1827
6	251-300	1828
7	301-350	1828
8	351-400	1829
9	401-450	1829
10	451-500	1830
11	501-550	1831
12	551-600	1832
13	601-650	1833
14	651-700	1834
15	701-750	1834
16	751-800	1836
17	801-850	1836
18	851-900	1837
19	901-950	1838
20	951-1000	1839
21	1001-1050	1839
22	1051-1100	1840
23	1101-1150	1841
24	1151-1200	1842
25	1201-1250	1842
26	1251-1300	1843
27	1301-1350	1843
28	1351-1400	1845
29	1401-1450	1845
30	1451-1500	1846
31	1501-1550	1846
32	1551-1600	1847
33	1601-1650	1847
34	1651-1700	1848
35	1701-1750	1848
36	1751-1800	1849
37	1801-1850	1849
38	1851-1900	1849
39	1901-1950	1849
40	1951-2000	1850
41	2001-2050	1850
42	2051-2100	1850
43	2101-2150	1851
44	2151-2200	1851

Edition 2, Ser. 1

Fasc.	Numbers	Date
1	1-50	1836
2	51-100	1837
3	101-150	1838
4	151-200	1838
5	201-250	1838
6	251-300	1838
7	301-350	1839
8	351-400	1839
9	401-450	1840
10	451-500	1840
11	501-550	1841
12	551-600	1841
13	601-650	1842

14	651-700	1842
15	701-750	1843
16	751-800	1843
17	801-850	1843
18	851-900	1845
19	901-950	1845
20	951-1000	1845
21	1001-1050	1846
22	1051-1100	1846
23	1101-1150	1846
24	1151-1200	1847
25	1201-1250	1847
26	1251-1300	1847
27	1301-1350	1848
28	1351-1400	1848
29	1401-1450	1848
30	1451-1500	1849
31	1501-1550	1849
32	1551-1600	1849
33	1601-1650	1850
34	1651-1700	1850
35	1701-1750	1850
36	1751-1800	1851
37	1801-1850	1851

Edition 2(2)
(Or Series 3, or ED 3)

Fasc.	Numbers	Date
1-2	1-100	26 Feb 1853
3-4	101-200	5 Aug 1854
5-6	201-300	17 Feb 1855
7-8	301-400	19 Apr 1856
9-10	401-500	21 Mar 1857
11-12	501-600	20 Mar 1858
13-14	601-700	30 Apr 1859
15-16	701-800	1860

Note: The species included in fascicles issued during the period over which Fries *Systema Mycologicum* are listed here.

Fascicule I. 1825.

15. *Agaricus stypticus* Pers.; 16. *Polyporus expansus* N.; 17. *Peziza albovio-lascens* b. *alba* Fries; 18. *Uredo potentillarum* var. d. *Potentillae Fragariae* Dec.; 19. *Uredo rumicum* var. b. *Rumicis acetasae* Dec.; 20. *Uredo onobrychis* Desmaz.; 21. *Uredo ficariae* Dec.; 22. *Uredo betae* var. a. *Betae vulgaris* Pers.; 23. *Uredo cichoracearum* Dec.; 24. *Puccinia apii* Desmaz.; 25. *Puccinia* Desmaz.; 26. *Puccinia mucronata* var. a. *rosae* Pers.; 27. *Aecidium ficariae* Pers.; 28. *Aecidium convallariae* Desmaz.; 29. *Aecidium tussilaginis* Gmel.; 30. *Sclerotium stercorarium* Dec.; 31. *Sclerotium durum* Pers.; 32. *Sclerotium populneum* Pers.; 33. *Sclerotium salicinum* Dec.; 34. *Sphaeria cinnabarrina* Fries; 35. *Sphaeria peziza* Pers.; 36. *Sphaeria acuta* Pers.; 37. *Sphaeria complanata* Tode Meckl.; 38. *Dothidea typhina* Fries; 39. *Dothidea Robertiani* Fries.

Fascicule II. 1825.

64. *Phyllerium juglandinum* Fries; 65. *Phyllerium viteum* Fries; 66. *Erineum alneum* Pers.; 67. *Rhizomorpha subcorticalis* Pers.; 68. *Racodium cellare* Pers.; 69. *Ozonium fulvum* Pers.; 70. *Xylostroma corium* Pers.; 71. *Polyporus versicolor* Fries; 72. *Polyporus cellaris* N.; 73. *Calocera cornea* Fries; 74. *Uredo phaseolorum* Dec.; 75. *Uredo pisi* Dec.; 76. *Uredo alliorum* var. b. *allii porri* Dec.; 77. *Uredo candida* Pers. var. a. *Cruciferarum*; 78. *Puccinia mucronata* var. b. *rubi* Pers.; 79. *Puccinia pruni* Dec.; 80. *Puccinia polygoni amphibii* Pers.; 81. *Puccinia junci* N.; 82. *cancellatum* Link; 83. *Hysterium fraxini* Pers.; 84. *Hysterium pinastri* Schrad.; 85. *Hysterium arundinaceum* Schrad.

Fascicule III. 1826.

113. *Sporotrichum geochroum* N.; 114. *Trichothecium roseum* Link; 115. *Cladosporium herbarum* Link; 116. *Thelephora hirsuta* a. *vulgaris* Pers.; 117. *Thelephora purpurea* Pers.; 118. *Thelephora intermedia* N.; 119. *Thelephora Lycii* Pers.; 120. *Agaricus griseo-pallidus* N.; 121. *Trichoderma aeruginosum* Link; 122. *Trichoderma viride* Pers. var. a. *intermedium* N.; 123. *Uredo carbo* Dec.; 124. *Uredo caries* Dec.; 125. *Uredo rubigo-vera* Dec.; 126. *Uredo linearis* Dec. var. a. *frumenti* Pers.; 127. *Uredo iridis* N.; 128. *Uredo statices* N.; 129. *Uredo rosae* var. a. *dispersa* N.; 130. *Puccinia graminis* Pers.; 131. *Puccinia arundinacea*; 132. *Aecidium statices* N.; 133. *Aecidium quadrifidum* Dec.; 134. *Aecidium crassum* Pers.; 135. *Melanconium betulinum* Schm. et Kunz.; 136. *Stilbospora macrosperma* Pers.; 137. *Stilbospora pyriformis* Hoffm.; 138. *Spermoedia clavus* Fries.

Fascicule IV. 1826.

161. *Sporendonema casei* Desmaz.; 162. *Polythrincium Trifolii* Kunze et Schm.; 163. *Conoplea hispidula* Pers.; 164. *Conoplea gilva* Pers.; 165. *Erysibe Humuli* Link; 166. *Erysibe communis* var. a. *umbelliferarum* Link; 167. *Erysibe guttata* var. *Coryli* Link; 168. *Torula antennata* Pers.; 169. *Torula graminis* N.; 170. *Tubercularia vulgaris* Tode Meckl.; 171. *Tubercularia minor* Link; 172. *Tubercularia expallens* Fries; 173. *Peziza sulphurea* var. *leucophaea* Pers.; 174. *Peziza sphaerioides* Pers. var. *Lychnidis* N.; 175. *Peziza clavellata* N.; 176. *Agaricus fastibilis* Pers. var. *minor* N.; 177. *Agaricus campestris* Linn.; 178. *Agaricus Fascicularis* Huds.; 179. *Sphaeria Wahlenbergii* N.; 180. *Sphaeria Trifolii* Pers.; 181. *Sphaeria* Fries; 182. *Sphaeria pruinosa* Fries; 183. *Sphaeria Equiseti* N.; 184. *Depazea* Fries; 185. *Depazea* N.; 186. *Phacidium dentatum* Kunze et Schm.; 187. *Dothidea Chaetomium* Kunze; 188. *Phacidium Lauro-cerasi* N.; 189. *Labrella Ptarmicae* N.

Fascicule V. 1827.

211. *Helminthosporium velutinum* Pers.; 212. *Helminthosporium tenuissimum* Nees; 213. *Helminthosporium Cheiranthi* Libert.; 214. *Cladosporium epiphyllum* Link; 215. *Heterosphaeria Patella* Gre.; 216. *Clavaria fuliginea* Pers.; 217. *Clavaria cristata* Pers.; 218. *Clavaria setacea* N.; 219. *Clavaria* Pers.; 220. *Thelephora Sambuci* Pers.; 221. *tremelloides* Fries; 222. *Daedalea betulina* Reb. ; 223. *Uredo Rhinanthacearum* Dec.; 224. *Uredo Campanulae* Pers.; 225. *Uredo Ruborum* Dec.; 226. *Melanconium ovatum* Link; 227. *Melanconium sphaeroideum* Link; 229. *Septaria Ulmi* Fries; 230. *Septaria Oxyacanthae* Kunze; 231. *Exosporium minutum* Link; 232. *Asteroma Rosae* ; 233. *Sphaeria Lonicerae* Sow.; 234. *Sphaeria Fraxini* Fries; 235. *Sphaeria coniformis* Fries; 236. *Sphaeria lirella* Pers.; 237. *Chaetomium elatum* Kunze; 238. *Hysterium culmigenum* Fries.

PLANTS OF NANTUCKET COUNTY, MASS. Cent. 1-3. Numbers 1-300. 1937-1942. Waltham, Massachusetts.

Guba, Emil Frederick (1897-   )

DATES OF PUBLICATION: Stevenson p. 178-179

Century	Numbers	Date
1	1-100	1937
2	101-200	1939
3	201-300	1942

References: Hedwigia 78: (156). 1939, Rhodora 39: 367-376. 1937.

FH (dist.), BPI, PC (dist.)

PRINGLE'S MEXICAN FUNGI. Decade 1. Numbers 1-10. Sept. 1, 1896. Cambridge, MA (Cambridge Botanical Supply Company).

Seymour, Arthur Bliss (1859-1933)

Notes: Type collections of two new species were included: no. 9. *Puccinia tetramerii* Seymour, and no. 10. *Leptostroma vestita* Seymour & Patterson.

References: Lindau and Sydow no. 21378 and 21379. Stevenson p. 272-273. Hedwigia 36:(31). 1897. Bot. Kal. 1899. p. 119.

FH, BPI.

RELIQUIAE HOLWAYANAE. Fasc. 1-14. Numbers 1-700. 1927-1932. Minneapolis, Minn.

Holway, Edward Willet Dorland (1853-1923)

DATES OF PUBLICATION: Stevenson p. 193-198.

Fasc.	Numbers	Date
1-3	1-150	1927
4	151-200	1928
5-6	201-300	1931
7-14	301-700	1932

Notes: Contains material of South American Uredinales.

References: TL-2/2: 264.

FH, BPI, CUP

RELIQUIAE SUKSDORFIANA. FUNGI COLLECTED BY WILHELM N. SUKSDORF. Cent. 1. Numbers 1-98 (17 extra unnumbered). April, 1953. Pullman, Wash.

Shaw, Charles Gardner (1917-) and Cooke, William Bridge (1908-).

DATES OF PUBLICATION: From Stevenson p. 384-385.

FH, BPI, CUP, UPS (dist.), NY, PC (dist.)

RUSSULAE EXSICCATAE A JUL. SCHAEFFER IN ANNAL. MYCOLOG. VOL. 31 & 32. (RUSSULA-MONOGRAPHIE) DESCRIPTAE. Numbers 1-68a (108 specimens). 1933.

Schaeffer, Julius (1882-1944)

Notes: Specimens were issued to accompany Schaeffer's monograph of *Russula*. Specimens should be checked for uniformity. Printed specimen labels give page numbers on which material is described. In Ann. Mycol. 32: 143. 1934, Schaeffer says that his exsiccata was deposited in Dahlem, London, Uppsala, Alger, and Cambridge (FH). UPS lists suppl. I.

FH, UPS.

SAMMLUNG PRÄPARIERTER HUTPILZE. Lief. 1-6. Numbers 1-135. 1880-1882. St. Goar.

Herpell, Gustav Jacob (1828-1912)

DATES OF PUBLICATION: From title page.

Lief	Number	Date	FH copy	Reviews
1	1-35	Mai 1880		Bot. Zeitung 38(24):421. 1880 (11 Jun); *Bot. Centralbl. 1(17): 598. 1880.
2	36-55	Jun 1881	[Mai 1881]	*Bot. Centralbl. 2(23):361-362. 1881; Bot. Zeitung 39(30):482. 1881 (29 Jul).
3	56-75	Aug 1882	[Jul]	*Bot. Centralbl. 3(35):334. 1882; Bot. Zeitung 40(34):576. 1882.
4	76-95	Jun 1884		
5	96-115	Sep 1888	[Jul]	
6	116-135	Mai 1892		

Notes: Herpell's methods preserved the general form of the basidiocarps by pressing thin sections of them. Singer (Mycologia 55: 683-684. 1963) comments on certain undesirable qualities of the technique and reviews the literature on the method. Weigel (Herbarium 1:3. 1908) stated that there were 150 species in 6 fascicles. I have only seen 135. It seems there were several "editions" distributed.

References: Lindau and Sydow no. 12119, TL-2/2:174, Bot. Kal. 1899. p. 119.

FH, BPI, S, C (lief. 5 only), BM (list), HBG

*specimens listed

SCHÄDLICHE PILZE UNSERER KULTURGEWÄCHSE, GESAMMELT UND HERAUSGEGEBEN.

Fasc. 1-5. Numbers 1-250. 1896-1917. Koenigstein A. Elbe.

Krieger, Karl Wilhelm (1848-1921)

DATES OF PUBLICATION: From title page and Hedwigia reviews.

Fasc.	Numbers		
1	1-50	1896	*Hedwigia beiblat. 35(3):(92)-(93). 1896 (Mai-Jun).
2	51-100	1899	*Hedwigia beiblat. 38(4/5):(241). 1899 (Jul-Oct).
3	101-150	1903	
4	151-200	1909	Hedwigia beiblat. 49(2):(90). 1909 (Sep).
5	201-250	1917	Hedwigia beiblat. 60(2):(177). 1918 (Nov).

Notes: Specimens are accompanied by extensive German notes and descriptions. Some specimens are marked "n.sp." such as no. 141. Fusarium vogelii P. Henn. A German description is included but Zeit. Pflanzenkrankh. 1902, p. 13 is also cited.

References: Bot. Kal. 1899. p. 119.; TL-2/2:674.

FH (lacks fasc. 5), BPI, S (fasc. 1 , nos. 1-40), BM (list), HBG

*specimens listed

SCHWEIZERISCHE KRYPTOGAMEN. UNTER MITWIRKUNG MEHRERER BOTANIKER.

Gesammelt und herausgegeben von Dr. B. Wartmann und B. Schenk. Cent. 1-9. Numbers 1-99. 1862-1882. St. Gallen (cent. 1-7). Hottingen bei Zurich (8-9).

Wartmann, Friedrich Bernhard (1830-1902)
Schenk, Bernard (1833-1893)
Winter, Georg (1848-1887)

DATES OF PUBLICATION: From Sayre, p. 54. Fungi are found in the following centuries:

Cent.	Fasc..	Numbers	Date	
1	1-2	1-50, 51-100	1862	Bot. Zeitung 20(17): 135-136. 1862 (25 Apr); Bot. Zeitung 20(22): 175-176. 1862 (30 Mai).
2	3-4	101-150, 151-200	1862	Bot. Zeitung 20(48): 415-416. 1862 (28 Nov).
3	5-6	201-300	1863	Hedwigia 3: 58. 1864 (Apr).
4	7-8	301-400	1863	Hedwigia 3: 58. 1864 (Apr).
5	9-10	401-500	1864	Bot. Zeitung 25(7): 55-56. 1867 (15 Feb).
6	11-12	501-600	1866	
7	13-14	601-700	1869	
8	15-16	701-800	1880	Bot. Zeitung 39(7):118. 1881, Bot. Centralbl. 1(42/43):1343. 1880*
9	17-18	801-900	1882	Bot. Zeitung 41(27):454. 1883. Hedwigia 19:42-43. 1880 (Jan). Hedwigia 22:32. 1883 (Feb).

Notes: Wartmann and Schenk assembled and edited Centuries 1-7; Wartmann and Winter issued 8 and 9. Fascicle numbers were assigned until Century 8. The dated covers, at least in the FH copy, do not agree in several cases with the review dates reported by Sayre.

The fungi are the first numbers in the centuries. Several new species, with descriptions were noted: no. 318. *Hendersonia sambuci* Müll. Arg. Mss.; no. 401. *Uromyces Geranii* Otth & Wartm.; no. 402. *U. veratri* Otth & Wartm.

An alphabetical list of the contents of Centuries 1-5 was published privately by Wartmann in 1865. It is titled "Schweizerische Kryptogamen Verzeichnis der species und varietäten welche in den Centurien I-V enthalten sind."

References: Lindau and Sydow 28369, 28370, Bot. Kal. 1899, p. 118.

FH, UPS (601-900 and dist.), S, BM (list).

*Contents listed

SCLEROMYCETI SUECIAE. COLLEGIT, DIGESSIT ET EVULGAVITI. Decades 1-45. 1819-1834. Lundae

Fries, Elias Magnus (1794-1878)

DATES OF PUBLICATION: See Holm and Nannefeldt, Friesia 7:10-59. 1962. Pfister, Mycotaxon 3: 185-192. 1975. TL-2/1:878.

Fasc.	Decade	Number	Date
1	1-4	1-40	1819
2	5-7	41-70	1820
3	8-11	71-110	1820
4	12-14	111-140	1820
5	15-18	141-180	1821
6	19-22	181-220	1821
7	23-26	221-260	1822
8	27-30	261-300	1822
9	31-34	301-340	?1825

Note: Holm and Nannefeldt have noted that fascicle 9 may not have been issued in the same manner as the others. It seems not to exist anywhere as a unit. There was a second edition which was mounted on separate sheets. It contained 380 specimens. The second edition was not composed of duplicates of the first edition, and, therefore, Holm and Nannefeldt pointed out that typification from the exsiccata should be made on first edition material.

References: Bot. Kal. 1899. p. 119.

FH, FH-Curtis, BPI, UPS, S (fasc. 1, no. 1-40), C, BM (list).

SKOGENS SKADESVAMPAR. Fasc. 1,2. Numbers 1-50. 1912-1914. Stockholm.

Lagerberg, Karl Erik Torsten (1882-1970)
Sylven, Nils Olaf Valdemar (1880-1969)

DATES OF PUBLICATION:

Fasc.	Numbers	Date	
1	1-25	1912	no new species
2	26-50	1914	#50 *Dothiorella ulmi* nov. spec. no description.

Note: See Landtmannabladet 1912. p. 75-76; 1913. p. 113*-139.*

S.

SPHAERIACEI BRITANNICI. Cent. 1-3. 300 Numbers. 1873-1878. King's Lynn.

Plowright, Charles Bagge (1849-1910)

DATES OF PUBLICATION: From title page.

Cent.	Number		
1	1-100	1873 [but see below]	*Hedwigia 12(7): 100-101. 1873 (Jul).
2	1-100	1875	*Grevillea 3(28): 164. 1875 (Jun).
3	1-100	1878	*Hedwigia 18(4): 58. 1879 (Apr).

Notes: At least the first century was reissued. The FH copy, a reissue, is dated 1878. Labels on the reissue are of a slightly different type face and size.

Plowright, apparently in a jocular mood, once wrote to W. G. Farlow, "Them folks as what I want to give a copy to, won't have it: and those as what I want to sell'em to don't seem to see it: oh, the troubles and sorrows of an 'exsiccati-ist.'"

References: Bot. Kal. 1899. p. 119. TL-2/4: 297.

FH, UPS (listed as III: 1-100), S, NY (partial).

*Contents listed or partially listed.

STIRPES CRYPTOGAMAE OXONIENSES, OR DRIED SPECIMENS OF CRYPTOGAMOUS PLANTS COLLECTED IN THE VICINITY OF OXFORD. Fasc. 1-2. Numbers 1-100. 1825 and 1828. Oxford.

Baxter, William (1787-1871)

DATES OF PUBLICATION: See Sayre p. 7.

Notes: Berkeley in *The English Flora* states that Baxter's "fasciculi of Cryptogamic plants" included many fungi. Clokie (p. 127) says the specimens of the Oxford set were identified by M. C. Cooke. Whether this means that they were issued without identifications, I do not know. I have not seen material.

References: Lindau and Sydow number 1987. TL-2/1:151. Bot. Kal. 1899. p. 116.

BM (list).

STIRPES CRYPTOGAMAE VOGESO - RHENANAE QUAS IN RHENI SUPERIORIS INGERIORISQUE NEC NON VOGESORUM PRAEFECTIERIS COLLEGERUNT. Fasc. 1-16. Numbers 1-1600. 1810-1890. Bruyeris Voges.

Mougeot, Jean Baptiste (1776-1858)
Nestler, Christian Gottfried (1778-1832)
Schimper, Wilhelm Philipp (1808-1880)
Mougeot, Jean Antoine (1815-1889)
Roumeguère, Casimir (1828-1892)

DATES OF PUBLICATION: Sayre p. 37.

Fasc.	Numbers	Date
1	1-100	1810
2	101-200	1811
3	201-300	1812
4	301-400	1813
5	401-500	1815 [1816]
6	501-600	1818
7	601-700	1820
8	701-800	1823 [1824]
9	801-900	1826
10	901-1000	1833 [1834]
11	1001-1100	1840
12	1101-1200	1843 [1845]
13	1201-1300	1850
14	1301-1400	1854
15	1401-1500	1860 [1861]
16	1501-1600	1890

Notes: Fascicles 1-11 were by Mougeot and Nestler, 12-14 were by Mougeot, Nestler and Schimper, 15 by J. M. and J. A. Mougeot, Nestler, and Schimper, 16 by Roumeguere. Alphabetical indices were published for fascicles 1-12 in 1843, and 13 and 14 in 1855. Sayre states that there is no evidence that fascicle 16 was issued. In a portion of the Patouillard Herbarium (FH) labeled Herbarium Richard, there is at least a partial set of the early numbers of this set. They are often without printed labels and appear to be in Mougeot's handwriting.

A list of fungi included from 1810-1833 follows:

Fasciculus I. 1810.

75. *Hysterium conigenum* Pers.; 76. *Hysterium pinastri* Schrad.; 77. *Xyloma acerinum* Pers.; 78. *Xyloma alneum* Pers.; 79. *Sphaeria typhina* Pers.; 80. *Sphaeria disciformis* Hoffm.; 81. *Sphaeria herbarum* Pers.; 82. *Sphaeria complanata* Decand.; 83. *Sclerotium Erysiphe* Pers. var. b. *corylea*; 84. *Tubercularia vulgaris* Pers.; 85. *Lycogala miniata* Pers.; 86. *Aecidium Berberidis* Pers.; 87. *Aecidium Cyparissiae* Decand.; 88. *Aecidium Tussilaginis* Gmelin; 89. *Aecidium crassum* Pers.; 90. *Uredo Lini* Decand.; 91. *Uredo Alchemillae* Pers.; 92. *Uredo Ruborum* Decand.; 93. *Uredo scuttellata* Pers.; 94. *Geoglossum hirsutum* Pers.; 95. *Geoglossum glabrum* Pers.; 96. *Peziza Solenia* Decand.; 97. *Erineum fagineum* Pers.; 98. *Erineum tiliaceum* Pers.; 99. *Erineum alneum* Pers.; 100. *Erineum populinum* Pers.

Fasciculus II. 1811.

174. *Schizoxylum sepincola* Pers.; 175. *Xyloma leucocreas* Decand.; 176. *Xyloma Andromedae* Pers.; 177. *Naemaspora crocea* Pers.; 178. *Sphaeria fusca* Pers.; 179. *Sphaeria faginea* Pers.; 180. *Sphaeria coccinea* Pers.; 181. *Sphaeria acuta* Pers.; 182. *Nidularia vernicosa* Bull. et Decand.; 183. *Aecidium cornutum* Pers.; 184. *Aecidium cancellatum* Pers.; 185. *Aecidium leucospermum*

Decand.; 186. *Aecidium Pini* Gmelin; 187. *Uredo miniata* var. a. *Eglanteriae* Pers.; 188. *Uredo farinosa* var. a. *Salicis capreae* Pers.; 189. *Uredo suaveolens* Pers.; 190. *Uredo candida* Pers.; 191. *Puccinia Anemones* Pers.; 192. *Puccinia Circaeae* Pers.; 193. *Puccinia Rubi* Decand.; 194. *Puccinia Phaseolorum* Decand.; 195. *Agaricus alneus* Linn.; 196. *Clavaria viscosa* Pers.; 197. *Peziza nigra* Bull. et Decand.; 198. *Erineum acerinum* Pers.; 199. *Erineum Vitis* Schrad.; 200. *Erineum betulinum* Rebent.

Fasciculus III. 1812.

266. *Hysterium pulicare* Pers.; 267. *Hysterium Fraxini* Pers.; 268. *Xyloma salignum* Pers.; 269. *Xyloma populinum* Pers.; 270. *Polystigma rubrum* Pers.; 271. *Polystigma fulvum* Pers.; 272. *Sphaeria Hypoxylon* Pers.; 273. *Sphaeria fragiformis* Pers.; 274. *Sphaeria melogramma* Pers.; 275. *Sphaeria ribesia* Pers.; 276. *Sphaeria deusta* Pers.; 277. *Sphaeria fimbriata* var. a. *Carpini* Pers.; 278. *Sphaeria nivea* Pers.; 279. *Sphaeria pulchella* Pers.; 280. *Sphaeria tubaeformis* Pers.; 281. *Sphaeria Aegopodii* Pers.; 282. *Scleroderma cervinum* Pers.; 283. *Nidularia striata* Bull. et Decand.; 284. *Trichia clavata* Pers.; 285. *Aecidium elatinum* Alb. et Schw.; 286. *Aecidium Rumicis* Pers.; 287. *Aecidium Rumicis* var. b. *Grossulariae* Pers.; 288. *Uredo linearis* var. a. *frumenti* Pers.; 289. *Uredo linearis* var. b. *Polypodii* Pers.; 290. *Uredo cruciferarum* Decand.; 291. *Uredo segetum* Pers.; 292. *Puccinia graminis* var. *Arundinis* Pers.; 293. *Puccinia Rosae* Decand.; 294. *Puccinia Ficariae* Decand.; 295. *Boletus perennis* Linn.; 296. *Hydnum concrescens* Pers.; 297. *Thelephora terrestris* Ehrh. et Pers.; 298. *Peziza pithya* Pers.; 299. *Dematium herbarum* Pers.

Fasciculus IV. 1813.

367. *Hysterium quercinum* Pers.; 368. *Hysterium gramineum* Pers.; 369. *Xyloma concentricum* Pers.; 370. *Xyloma betulinum* Funck; 371. *Sphaeria undulata* Pers.; 372. *Sphaeria stigma* Pers.; 373. *Sphaeria decorticans* Pers.; 374. *Sphaeria nummularia* Decand.; 375. *Sphaeria flavo-virens* Pers.; 376. *Sphaeria spinosa* Pers.; 377. *Sphaeria ferruginea* Pers.; 378. *Sphaeria prunastri* Pers.; 379. *Sphaeria gnomon* Pers.; 380. *Sphaeria mammaeformis* Pers.; 381. *Sphaeria pulvis pyrius* Pers.; 382. *Sphaeria moriformis* Pers.; 383. *Stilbospora macrosperma* Pers.; 384. *Stilbospora microsperma* Pers.; 385. *Sclerotium populneum* Pers.; 386. *Sclerotium salicinum* Pers.; 387. *Tulostoma brumale* Pers.; 388. *Aecidium Tragopogi* Pers.; 389. *Aecidium Urticae* Decand.; 390. *Uredo Tussilaginis* Pers.; 391. *Uredo Empetri* Pers.; 392. *Puccinia Asparagi* Decand.; 393. *Merulius cornucopioides* Pers.; 394. *Thelephora ferruginea* Decand.; 395. *Tremella spiculosa* Pers.; 396. *Tremella Urticae* Pers.; 397. *Peziza tuberosa* Bull. et Pers.; 398. *Peziza amorpha* Pers.; 399. *Peziza Abietis* Pers.; 400. *Racodium rupestre* Pers.

Fasciculus V. 1815.

474. *Hysterium elatinum* Pers.; 475. *Hysterium scirpinum* Pers.; 476. *Xyloma? striaeforme* Pers.; 477. *Xyloma punctatum* Pers.; 478. *Xyloma fagineum* Pers.; 479. *Xyloma Virgaeaureae* Decand.; 480. *Xyloma circinans* Pers.; 481. *Xyloma Empetri* Pers.; 482. *Sphaeria pomiformis* Pers.; 483. *Sphaeria Peziza* Pers.; 484. *Sphaeria spermoides* Pers.; 485. *Sphaeria Patella* Pers.; 486. *Sphaeria atrovirens* a. *Visci* Alb. et Swein.; 487. *Sphaeria Anemones* Pers.; 488. *Sphaeria genistalis* Pers.; 489. *Sclerotium durum* Pers.; 490. *Stemonitis fasciculata* Pers.; 491. *Daedalea asserculorum* Pers.; 492. *Merulius mesentericus* Pers.; 493. *Clavaria ericetorum* Pers.; 494. *Peziza Cerasi* Pers.

Fasciculus VI. 1818.

558. *Rhizomorpha fusca* Pers.; 559. *Phacidium coronatum* Fries; 560. *Phacidium multivalve* Kun. und Schm.; 561. *Phacidium dentatum* Kun. und Schm.; 562. *Phacidium Aquifolii* Kun. und Schm.; 563. *Hysterium angustatum* Pers.; 564. *Hysterium Rubi* Pers.; 565. *Sphaeria ophioglossoides* Pers.; 566. *Sphaeria puccinioides* Decand.; 567. *Sphaeria ceratosperma* Tode; 568. *Sphaeria lata* Pers.; 569. *Sphaeria stilbostoma* g. *platanoides rostellata* Fries; 570. *Sphaeria decolorans* Pers.; 571. *Sphaeria Doliolum* Pers.; 572. *Sphaeria strobilina* Holl und Schm.; 573. *Coryneum disciforme* Nees; 574. *Coryneum pulvinatum* Kun. und Schm.; 575. *Sclerotium quercinum* Pers.; 576. *Tubercularia confluens* Pers.; 577. *Lycoperdon perlatum* Pers.; 578. *Trichia fallax* b. Pers.; 579. *Licea strobilina* Alb. et Schw.; 580. *Agaricus stypticus* Bull.; 581. *Thelephora cruenta* Pers.; 582. *Thelephora disciformis* Decand.; 583. *Leotia lubrica* Pers.; 584. *Peziza vogesiaca* Pers.; 585. *Peziza digitalis* Alb. et Schw.; 586. *Peziza compressa* Pers.; 587. *Peziza pinastri* Pers.; 588. *Peziza Nidulus* Schm. und Kun.; 589. *Torula fuliginosa* Pers.

Fasciculus VII. 1820.

652. *Xyloma Bistortae* Decand.; 653. *Xyloma varium* Pers.; 654. *Hysterium malaleucum* Fries; 655. *Hysterium arundinaceum* Pers.; 656. *Hysterium abietinum* Pers.; 657. *Actynothyrium graminis* Schm. und Kunz.; 658. *Asteroma Polygonati* Decand.; 659. *Sphaeria pustulata* Hoffm.; 660. *Sphaeria Tiliae* Pers.; 661. *Sphaeria maculiformis* Pers.; 662. *Sphaeria punctiformis* Pers.; 663. *Sphaeria Lichenoides* var. e. *Hederaecola* Decand.; 664. *Sphaeria Spartii* Nees; 665. *Sphaeria accumulata* Pers.; 666. *Sphaeria trichina* Pers.; 667. *Sphaeria padina* Pers.; 668. *Sphaeria Lirella* Pers.; 669. *Asterosporium Hoffmanni* Kunze; 670. *Melanconium betulinum* Schm. und Kunz.; 671. *Scleroglossum lanceolatum* Pers.; 672. *Scleroglossum conicum* Pers.; 673. *Sclerotium Pteridis* Pers.; 674. *Sclerotium nitidum* Pers.; 675. *Puccinia graminis* Pers.; 676. *Puccinia Buxi* Decand.; 677. *Agaricus androsaceus* Pers.; 678. *Sistotrema violaceum* Pers.; 679. *Thelephora quercina* Pers.; 680. *Thelephora frustulata* Pers.; 681. *Thelephora Piceae* Pers.; 682. *Clavaria cornea* Pers.; 683. *Clavaria obtusa* Sowerb.; 684. *Geoglossum Sphagnorum* Pers.; 685. *Leotia uliginosa* Pers.; 686. *Peziza Atropae* Pers.; 687. *Peziza cerina* Pers.; 688. *Polythrincium Trifolii* Kunze und Schm.; 689. *Xylostroma giganteum* Tode; 690. *Fumago foliorum* Pers.

Fasciculus VIII. 1823.

759. *Rhizomorpha subcorticalis* Pers.; 760. *Xyloma Spiraeae* Kunze; 761. *Xyloma umbilicatum* Pers.; 762. *Hysterium degenerans* Fries; 763. *Sphaeria capitata* Pers.; 764. *Sphaeria cohaerens* Pers.; 765. *Sphaeria vogesiaca* Pers.; 766. *Sphaeria Ulmi* Schleich.; 767. *Sphaeria oxystoma* Pers.; 768. *Sphaeria Penicillus* Pers.; 769. *Sphaeria acinosa* Fries; 770. *Sphaeria fuliginosa* Pers.; 771. *Sphaeria cupularis* Pers.; 772. *Sphaeria Pinastri* Decand.; 773. *Sphaeria pulveracea* Pers.; 774. *Sphaeria foraminosa* Pers.; 775. *Onygena equina* Pers.; 776. *Nidularia Crucibulum* Fries; 777. *Hydnum auriscalpium* Pers.; 778. *Thelephora pergamenea* Pers.; 779. *Thelephora Sambuci* Pers.; 780. *Geoglossum glutinosum* b. *lubricum* Pers.; 781. *Leotia Clavus* Pers.; 782. *Helotium aureum* Pers.; 783. *Peziza aurelia* Pers.; 784. *Peziza citrina* Pers.; 785. *Peziza herbarum* Pers.; 786. *Peziza nervisequa* Pers.; 787. *Peziza carpinea* Pers.; 788. *Peziza umbilicata* Pers.; 789. *Peziza Aucupariae* Pers.; 790. *Racodium cellare* Pers.

Fasciculus IX. 1826.

860. *Lasiobotrys Lonicerae* Kunze; 861. *Dothidea Hederae* Fries; 862. *Dothidea Robertiani* Fries; 863. *Dothidea stellaris* Fries; 864. *Actinonema Crataegi* Pers.; 865. *Rhytisma Urticae* Fries; 866. *Sphaeria bullata* Pers.;

867. *Sphaeria verrucaeformis* Pers.; 868. *Sphaeria quercina* Pers.; 869. *Sphaeria Sorbi* Fries; 870. *Sphaeria syngenesia* Fries; 871. *Sphaeria profusa* Fries; 872. *Sphaeria ambiens* Pers.; 873. *Sphaeria Laburni* Pers.; 874. *Sphaeria Berberidis* Pers.; 875. *Sphaeria elongata* Fries; 876. *Sphaeria graminis* Pers.; 877. *Sphaeria Coryli* Batsch ; 878. *Sphaeria palina* Fries; 879. *Sphaeria Aquifolii* Fries; 880. *Sphaeria oedema* Fries; 881. *Cytospora chrysosperma* Fries; 882. *Blennoria Buxi* Fries; 883. *Sclerotium areolatum* Fries; 884. *Sclerotium roseum* Kneiff ; 885. *Phacorhiza sclerotioides* Pers.; 886. *Excipula aspera* Fries; 887. *Peziza Frangulae* Pers.; 888. *Peziza Ariae* Pers.; 889. *Cenangium difforme* Fries; 890. *Cenangium repandum* Fries; 891. *Triphragmium Ulmariae* Link; 892. *Triphragmium Isopyri* Nob.; 893. *Septaria Ulmi* Fries; 894. *Fusidium griseum* Dittm.

Fasciculus X. 1833.

958. *Sphaeria punctata* Fries; 959. *Sphaeria Hystrix* Tode; 960. *Sphaeria strumella* Fries; 961. *Sphaeria leiphaemia* Fries; 962. *Sphaeria stilbostoma* v. a. *papula* Fries; 963. *Sphaeria rimosa* Alb. et Schw.; 964. *Sphaeria Junci* Fries; 965. *Sphaeria aquila* Fries; 966. *Sphaeria barbara* Fries; 967. *Sphaeria eutypa* Fries; 968. *Sphaeria pruinosa* Fries; 969. *Sphaeria macularis* Fries; 970. *Sphaeria brunneola* Fries; 971. *Sphaeria Dothidea* b. *Rosae* Fries; 972. *Sphaeria Miribelii* Moug.; 973. *Vermicularia trichella* Fries; 974. *Depazea buxicola* Fries; 975. *Depazea ilicicola* Fries; 976. *Depazea cruenta* Fries; 977. *Sphaeronema cladoniscum* Fries; 978. *Sphaeronema colliculosum* Fries; 979. *Phoma Hederae* Desmaz.; 980. *Dothidea Pteridis* Fries; 981. *Dothidea Himantia* Fries; 982. *Dothidea reticulata* Fries; 983. *Eustegia arundinacea* Fries; 984. *Phacidium leptideum* Fries; 985. *Phacidium Lauro-Cerasi* Desmaz.; 986. *Phacidium ? Craterium* Fries; 987. *Labrella Ptarmicae* Desmaz.; 988. *Ectostroma Sedi* Fries; 989. *Sclerotium varium* Pers.; 990. *Sclerotium herbarum* Fries; 991. *Thelephora acerina* Pers.; 992. *Hymenula rubella* Fries; 993. *Exidia Auricula Judae* Fries; 994. *Geoglossum viride* Pers.; 995. *Pterula subulata* Fries; 996. *Illosporium coccineum* Fries; 997. *Trichothecium roseum* Link; 998. *Sporendonema Casei* Desmaz.

References: Bot. Kal. 1899. p. 117; TL 2/3: 606. 1981.

FH (also 1 dist.), BPI (1-1200), CUP, UPS, S (fasc. I-XV, nos. 75-1420), BM (list), NY.

SVERIGES PHARMACEUTISKA VAXTER MED PHARMAKOLOGISKA UPPLYSNINGAR.

Fasc. 1-8. 740 specimens. 1863-1872, Uppsala.

Fristedt, Robert Fredric (1832-1893)

DATES OF PUBLICATION: From title page.

Fasc.	Numbers	Date
1	1-100	1863
2	1-100	1864
3	1-100	1865
4	1-100	1865
5	1-100	1866
6	1-100	1867
7	1-100	1869
8	1-40	1872

Notes: Only six fungi were included in this series which was largely composed of phanerogams. None were new species.

References: Sayre p. 24, TL-2/1: 891.

UPS.

UREDINEAE AMERICANAE EXSICCATAE. Fasc. 1. Number 1-50. Jan. 1894. Manhattan, Kansas.

Carleton, Mark Alfred (1866-1925).

DATES OF PUBLICATION: Stevenson p. 78-79.

Notes: A list of included specimens may be found in Bot. Centralbl. 58(7): 239. 1894 (8 Mai).

References: Lindau and Sydow number 4663. TL-2/1: 457; Bot. Kal. 1899. p. 118.

FH, BPI.

UREDINEAE EXSICCATAE ET ICONES. Fasc. 1-4. Numbers 1-60. Sept. 1894-Oct. 1902. Decorah, Iowa.

Arthur, Joseph Charles (1850-1942) and Holway, Edward Willet Dorland (1853-1923).

DATES OF PUBLICATION: Stevenson p. 17-20.

Fascicles	Numbers	Date	
1	1-17, 31 spec.	Sept. 1894	*Bot. Centralbl. 61(7):257. 1895. (13 Feb).
2	18-34, 55 spec.	Dec. 1898	Bot. Centralbl. 78(4): 108-109. 1899. (12 Apr).
3	45-60, 28 spec.	June 1901	Bot. Centralbl. 87(6): 218-219. 1901. (31 Jul).
4	45-60, 48 spec.	Oct. 1902	

Notes: Stevenson says of this set, "This series of four well-bound volumes with printed title pages, informative prefaces, adequate tables of contents, and unique and comprehensive illustrations provides an outstanding example of the thesis that exsiccati should not be broken up for distribution in a general herbarium." Some photographs were also included. The set was available in two forms--one bound, one unbound.

References: Stevenson p. 17-20. Lindau and Sydow number 1202. TL-2/1:70, Bot. Kal. 1899. p. 118.

FH, BPI, CUP, S, BM (list), NY, HBG

*specimens listed

UREDINEEN. Fasc. 1-57. Numbers 1-2850. 1888-1924 (?). Berlin.

Sydow, Paul (1851-1925).

DATES OF PUBLICATION: Stevenson p. 415-429. Most fascicles were also noted in Hedwigia.

Fasc.	Numbers	Date
1	1-50	1888
2	51-100	1889
3	101-150	1889
4	151-200	1889
5	201-250	1889
6	251-300	1890
7	301-350	1890
8	351-400	1890
9	401-450	1890
10	451-500	1890
11	501-550	1891
12	551-600	1891
13	601-650	1892
14	651-700	1892
15	701-750	1892
16	751-800	1893
17	801-850	1894
18	851-900	1894
19	901-950	1895
20	951-1000	1895
21	1001-1050	1896
22	1051-1100	1896
23	1101-1150	1897
23a	1a-50a	1898
24	1151-1200	1898
25	1201-1250	1898
26	1251-1300	1899
27	1301-1350	1899
28	1351-1400	1899
29	1401-1450	1900
30	1451-1500	1900
31	1501-1550	1901
32	1551-1600	1902
33	1601-1650	1902
34	1651-1700	1903
35	1701-1750	1903
36	1751-1800	1903
37	1801-1850	1904
38	1851-1900	1905
39	1901-1950	1905
40	1951-2000	1906
41	2001-2050	1906
42	2051-2100	1907
43	2101-2150	1907
44	2151-2200	Oct. 1908
45	2201-2250	Oct. 1908
46	2251-2300	Dec. 1909
47	2301-2350	Dec. 1910
48	2351-2400	Oct. 1911
49	2401-2450	Nov. 1912
50	2451-2500	Nov. 1912

51	2501-2550	Dec. 1913
52	2551-2600	1915
53	2601-2650	1915
54	2651-2700	1916
55	2701-2750	1916
56	2751-2800	1924(?)
57	2801-2850	1924(?)

Notes: Fascicle 23a (numbers 1a-50a) issued in 1898 by F. W. Neger also bore the title Uredineae Austro-Americanae. Early numbers had handwritten or printed labels.

References: Bot. Kal. 1899. p. 120.

FH (plus partial set dist.), BPI, UPS, S, HBG

UREDINEEN SÜDDEUTSCHLANDS UNTER MITWIRKUNG VON DR. PAUL DIETEL UND DR. KARL VON SCHÖNAR (?). Cent. 1-4. Numbers 1-400. 1932.

Eichhorn, Eugen (-) and Poeverlein, Herman (1874-1957).

DATES OF PUBLICATION: The only published account I have noted is Hedwigia 73: (82). 1933.

Cent.	Numbers
1	1-100
2	101-200
3	201-300
4	301-400

Notes: Mimeographed lists were prepared to accompany the set. These lists include hosts. Labels were also mimeographed. No nomenclatural novelties were noted. See TL-2/4: 314.

FH

USTILAGINALES. Cent. 1- 3. Numbers 1-250. Sept. 1975-1979 (in progress).

Vanky, Kálmán (1930-)

FH, BPI, UPS (dist.), C (dist.).

USTILAGINALES POLONIAE EXSICCATI. Fasc. 1-3. Numbers 1-75. Jan. 1938-Jan. 1939. Varsavia.

Kochman, Józef (-)

DATES OF PUBLICATION: From title pages of FH set.

Fasc.	Number	Dates
1-2	1-50	Jan 1938
3	51-75	Jan 1939

Notes: The set was issued with species and host lists.

FH, BPI, S.

USTILAGINEEN. Fasc. 1-13. Numbers 1-500. 1894-1915. Berlin.

Sydow, Paul (1851-1925)

DATES OF PUBLICATION: Stevenson p. 430-434.

Fasc.	Numbers	Date
1	1-50, 10b	1894
2	51-100	Oct 1895
3	101-150	Sep 1897
4	151-200	Jun 1899
5	201-250	Jun 1900
6	251-300	Nov 1901
7	301-350	Aug 1904
8	351-375	Jul 1907
9	376-400	Mar 1908
10	401-425	Apr 1910
11	426-450	Oct 1911
12	451-475	Dec 1913
13	476-500	1915

Notes: A number of type specimens were included. Early labels were handwritten and reproduced by some method.

References: Bot. Kal. 1899. p. 120.

FH, BPI, UPS, S, C (dist.), BM (list), HBG

USTILAGINEEN EUROPAS. Lief. 1-14. Numbers 1-140. 1925-1935. Trier.

Zillig, Herman (1893-1952)

DATES OF PUBLICATION: From FH set, Hedwigia, and Herbarium.

Lief.	Number		
1-4	1-40	11 Jun 1925	Hedwigia 66:(118). 1925.
5-7	41-70	11 Jan 1925	Hedwigia 67:(90). 1926.
8-10	71-100	Mai 1927	Herbarium 2: 281. 1927.
11-12	101-120	Indexed FH, June 1932	Hedwigia 73: (83), 1933; 74: (138). 1934.
13-14	121-140	25 Jan 1935	Hedwigia 75: (165). 1935.

Notes: Numbers 1-100 were listed in Ann. Mycol. 29: 129-130, 1931.

FH, BPI, CUP, UPS, S.

VEGETABILIA CELLULARIA IN GERMANIA SEPTENTRIONALI PRAESERTIM IN HERCYNIA ET IN AGRO GÖTTINGENSI. 1832-1845. Göttingen.

Bartling, Friedrich Gottlieb (1798-1875)
Hampe, Georg Ernst Ludwig (1795-1880)

Notes: Sayre (p. 7) pointed out that the set was broken into series. Series A was *Musci frondosi*, series B., *Hepaticae*, and series C., *Lichenes*. Series D was devoted to Fungi. Each series was divided into fascicles. Only the contents of Section D fascicle I is known to me, and these are listed as follows from Flora 15(2) *Intell.* 3: 38-40. 1832: *Aecidium convallariae* Schum., *Puccinia graminis* Pers.; *Fusarium themelloides* Grev.; *Rhytisaca geranii* Spreng., *Hysterium fraxini* Pers.; *H. pinastri* Schrad.; *Alphitomorpha tortilis* Wallr.; *Sphaeria longissima* Pers.; *Sphaeria graminis* Pers.; *Sphaeria nivea* Hoffm.

Wiegel (Herbarium 1: 332. 1914) lists Decades 1-8.

References: TL-2/1:126, 2:37.

WEST AMERICAN FUNGI. Century 1-4. Numbers 1-400. 1901-1902. Takoma Park, D.C.

Griffiths, David (1867-1935)

DATES OF PUBLICATION: Stevenson p. 174-177.

Century	Number	Date
1	1-100, 25 extra	1902
2	101-200, 21 extra	1902
3	201-300, 24 extra	1902
4	301-400, 19 extra	1902

References: TL-2/1: 1006.

FH, BPI, CUP.

WESTFÄLISCHE PILZE IN GETROCKNETEN EXEMPLAREN. Lief. I-IV. Numbers 1-200. 1900-1908. Lengerichi, Westphalia.

Brinkmann, Wilhelm (1860-1917)

DATES OF PUBLICATION: From title page, FH index, and Hedwigia.

Lief.	Numbers	
I (Thelephoraceen)	1-50	1900; arrived FH, 14 Sep 1904; Hedwigia 39:(221). 1900.
II (Thelephoraceen und Hydnaceen)	51-100	1904; Hedwigia 45:(202). 1906.
III (Thelephoraceen, Hydnaceen, und Polyporaceen)	101-150	1906; indexed FH, 26 June 1905.
IV (Thelephoraceen, Hydnaceen und Polyporaceen)	151-200	1908; received FH, 18 Dec 1908 ; Hedwigia 48:(194). 1908.

Notes: New species were described with Latin descriptions. Weigel (Herbarium 1: 3. 1908) offered fascicles 1-3 at 25 Marks. Fascicle 4, which was forthcoming, was offered at 30 Marks.

The following new species were described: no. 1. *Corticium pallens* Bres., no. 18. *Cortineum (Glococystidium) stramineum* Bres., no. 56. *Corticium roseo-cremeum* Bres., no. 108. *Hypochnus tabacinus* Bres., no. 153. *Corticium caesio-cinereum* v. H. & L. (no description).

Each fascicle was accompanied by a printed list of contents.

FH, BPI, UPS, HBG.

DOUBTFUL, EXCLUDED, OR INCOMPLETELY KNOWN SETS

The following titles have been found in the literature or in herbaria but are not uniform sets, are "popular" in nature, or are sets which are known only as distributed specimens. In some cases, sets which do not contain fungi are listed to avoid confusion. Sets containing material of various gall forming insects are listed in part because these were often assembled by mycologists.

BEITRÄGE ZUR MECKLENBURGISCHEN PILZFLORA VON DR. B. FIEDLER. Heft 1-3. 157 specimens (unnumbered). 1848-1850. Schwerin.

Fiedler, [Carl Friedrich] Bernard (1807-1869)

DATES OF PUBLICATION: From title pages.

Heft	Date
1 (Uredinei (Uredo)) 52 specimens	1848 (includes a 3-page introduction)
2 (Uredinei (Aecidium, Puccinia, Phragmidium etc.)) 54 specimens	1848
3 (Sphaeriacei (Sphaeria)) 51 specimens	1850 *Bot. Zeitung 9(31): 573-574. 1851. (8 Aug).

Notes: Specimens were issued without numbers. They were glued in books (18 x 26 cm) with labels which included the name of the fungus and the substrate. No new species were included. Since its specimens were unnumbered when issued, it cannot be considered an exsiccata in the strict sense. Stafleu and Cowan report 163 specimens.

References: TL-2/1:828.

FH, BM (list)

*specimens listed

CECIDOTHECA FENNICA. Fasc. 1-2. Numbers 1-50. 1912-1913.

Hintikka, Toivo Juho (1880-1952)

DATES OF PUBLICATION: From Hedwigia

Fasc.	Numbers	
1	1-25	Hedwigia 53(3):(233). 1913. (Apr)
2	26-50	Hedwigia 54(2):(124). 1913. (Nov)

Notes: This set contains insect galls.

CECIDOTHECA ITALICA, RACCOLTE DI GALLE ITALIANE DETERMIENATE, PREPARATE E ILLUSTRATE. Fasc. 1-20. Numbers 1-500. 1904-1912. Avellino.

Trotter, Alexandro (1874-1967)

DATES OF PUBLICATION: From Hedwigia.

Fasc.	Numbers		
1-12	1-300	1904	Hedwigia 44:(179). 1905.
13-15	301-375	1906	Hedwigia 46:(143). 1907.
16-18	376-450	1907	Hedwigia 48:(89). 1908.
19-20	451-500	1909	Hedwigia 49:(90). 1909.

Notes: This set contains insect galls.

BPI (nos. 1-575)

CHAMPIGNONS DE FRANCE 1892-3.
10 boxes with 250 micro-slides.

Tempère, Johannes Albert (1847-1926) and Dutertre, E. (-)

Note: This set has not been seen. It was cited in Herbarium 1: 161 and 1: 180.

CHAMPIGNONS DES ILES DE ST. THOMÉ ET DES PRINCES. 62 numbers. 1890.

Bresadola, Giacomo (1847-1929) and Roumeguère, Casimir (1828-1892).

DATES OF PUBLICATION: Rev. Mycol. 12: 25. 1890., also see Bol. Soc. Brot. 9: 38-44. 1891 [a reprint from Rev. Mycol. by Bresadola].

Notes: Since specimens were issued unnumbered and it is not known if sets were identical in content, the set is not a true exsiccata. Stafleu and Cowan state that sets are located in B, FH, L, PC. At UPS the title is listed as "Nouv. Contr. Fl. Mycol. Saint Thomé et Princes."

Collections were made by F. Moller, F. Quintas and F. Newton. Species from the entire series were studied by Bresadola and Roumeguère and are listed in Rev. Mycol. 12: 25. 1890.

References: Lindau and Sydow no. 3884; TL-2/1:317.

FH, UPS

CHAMPIGNONS DU TONKIN (1887-89). Numbers 1-165. 1894.

Balansa, Benedict Benjamin (1830-1891).

Notes: This is not a standardized set. There are many unidentified specimens; the FH set also contains Lichens and Hepatics. The set, however, contains type specimens of species described by N. T. Patouillard (see J.

Bot. (Moret) 4: 12-20, 53-67. 1890) and Karsten and Roumeguère (Rev. Mycol. (Toulouse) 12: 75-79. 1890). Specimens were received at FH prior to May 14, 1904, the date on which they were indexed.

FH, UPS (1-130).

CHERMOTHECA ITALICA CONTINENS EXSICCATA (in situ) Coccidarum plantis, praecipue cultis, in Italia occurentibus, obnoxiarum.

COCCIDEN-SAMMLUNG. Ser. (?) 1-21. Numbers 1-? 228. 1909-1921.

Jaap, Otto (1864-1922).

DATES OF PUBLICATION: Hedwigia 51-62.

Note: This set contains insect galls.

COLLECTION DES CRYPTOGAMES DE L'AMÉRIQUE du SUD (DETERMINÉS PAR NICOLAS ET ARSENE). Cent. 1. Number 1-100. 1912.

Héribaud-Joseph, Frère [Jean Baptiste Caumel] (1841-1918)

Notes: Sayre says "Cited by title in Herbarium 27, 1912, Oesterr. Bot. Zeitschr. 63: 46, 1913, and Hedwigia Beibl. 53:(168), 1913. Herbarium 31, p. 285, 1931, notes that specimens were determined by Nicholas and Arsene.

TL-2/2: 169.

COLLECTION SPÉCIALE DE CHAMPIGNONS QUI ENVAHISSENT LES VÉGÉTAUX CULTIVÉS. Cent. 1-4. 1881.

Roumeguère, Casimir (1828-1892)

DATES OF PUBLICATION: Roumeguère (Rev. Mycol. (Toulouse) 3(11): 15. 1881) says the following of the set:

"Pour répondre à la demande de quelques Ecoles supérieures d'agriculture, nous avons formé une collection spéciale de *Champignons qui envahissent les végétaux cultivés* (céréales, plantes potagères, plantes économiques et industrielles, arbres fruitiers, essences forestières, etc.) Cette collection a été en partie rétiree de nos *Fungi Gallici* et complétée par des specimens à notre disposition, mais en trop petit nombre pour être compris dans la collection générale. Elle formera quatre volumes, c'est-à-dire quatre centuries (1). Les types ont été choisis avec soin et offrent tous les caractères mycologiques exigés pour l'étude et la démonstration.

References: Lindau and Sydow number 23042. TL-2/4: 934.

BPI.

COLORADO FUNGI, 1893-99.

Crandall, Charles Spencer (1852-1929)

Notes: This title is found on various labels but is not connected with formal issuance of exsiccatae.
Labels were seen in FH.

CRYPTOGAMES DE LA BELGIQUE.

Marchal, Élie (1839-1923).

Notes: This title was apparently used by Marchal in general distribution of exchange specimens. See TL-2/3: 287.

CRYPTOGAMES DU LYONNAIS.

Therry, Joseph Jean (1833-1888)

Note: This is an unnumbered and apparently mostly unnamed set of specimens. On what appears to be labels printed at FH, it reads, "2 genera not named (2 Normandie), 20 sps. not named, 16 named. Total 40." Most are undetermined Phomas. Some specimens are from Abbe Letendre.

References: Gola p. xi, Ann. Soc. Bot. Lyon 31: 107-128 (Biblio).

CRYPTOGAMIE NORMANDE.

Malbranche, Alexandra François (1818-1888)

Note: There are printed labels in FH with this title. Specimens are numbered; numbers seen are in the high thousands. Those seen are in Phoma.

References: Gola, p. x.

CRYPTOGAMISCHE GEWÄCHSE KOBURGS. Fascicles I-VI. Numbers 1-36 + (numbers unknown from fascicles 5 & 6). 1827-1828. Coburg.

Ekart, Tobias Phillipp (1799-1877)

References: Sayre, Mem. N.Y. Bot. Gard.19:20. TL-2/1:739.

FLORA CRYPTOGAMICA LUTETIAE PARISIORUM.

Delise, Dominic François (1780-1841)

Notes: TL-2/1:618 states that this set is at PC but that it is probably not a regular set.

FLORA CRYPTOGAMICA NANCEIENSIS EXSICCATA. Fasc. i-ii. 1-100. Nancy.

Godron, Dominique Alexandre (1807-1880).

Notes: Sayre p. 27 notes this set but has seen only a single label. Lichens and algae were included but I have no records of fungi having been included.

References: TL-2/1:961.

FLORA GALLIAE ET GERMANIAE EXSICCATA. I. Cent. 1-16. Numbers 1-1600. 1836-1852. II. Cent. 1-16. Numbers 1-1600. 1846-1855. III. Cent. 17-33. Numbers 1601-3300. 1855-1861. IV. Cent. 34-40. Numbers 3301-4000. 1864-1869.

Schultz, Friedrich Wilhelm (1804-1876), Billot, Paul Constant (1796-1863), Bavoux, Eugene-Vital (1821-1909), Guichard, Albert (1822-1902), Guichard, Paul (18- -1909), Paillot, Justin (1829-1891).

Notes: I have found no evidence that fungi were included in this general set.

See Sayre, Mem. N. Y. Bot. Gard. 19(1): 44-46 for references. TL-2/1: 215. Also Salmon, Journ. of Bot. 66: 107-113. 1928.

FLORA GALLICA EXSICCATA.

Gandoger, Michel (1850-1926).

Notes: This set is known only from reference to it in Gola, p. x, and TL-2/1:909.

References: Gola, p. x, TL-2/1:909.

FLORA MOSQUENSES EXSICCATA. Centuries I-IV. 500 numbers. 1849-1851. Moscou.

Annenkov, Nicolas Ivanovich (1819-1889).

DATES OF PUBLICATION: Sayre p. 6. TL-2/1: 53.

FLORA THAMENSIS.

Ayres, Philip Burnard (1813-63) and Baxter, William (1787-1871).

Note: The set was reported by Clokie (1923) to contain fungi. I have seen no other mention of the set. See TL-2/1: 151.

FLORIDA FUNGI.

Calkins, William Wirt (1849-1914).

Notes: Stevenson (p. 76-77) briefly discusses this irregular set.

References: TL-2/1:426.

FUNGI EPIPHYLLI. Lief. 1,2. 1809. Regensburg.

Hoppe, David Heinrich (1760-1846).

References: Lindau and Sydow number 12639, TL-2/2:304.

BM (fide Index of Collectors).

FUNGI EXSICCATI SELECTI.

Cooke, Mordecai Cubitt (1825-1914).

Note: Specimens ex Herbarium M. C. Cooke were issued under this title (Example: Sphaerella Bhauria Cke.; on Symplocos, Dinagepore, India).

The set was unnumbered. There are an unknown number of specimens in FH in the general fungus collection.

FUNGI GUARANITICI.

Spegazzini, Carlos (1858-1926).

An unknown number of sets were issued by Roumeguère under this title. Stevenson (p. 401) did not consider it a true exsiccata. Specimens were not uniformly numbered. Collections issued were made by Balansa in South America. The FH copy is dated 1889 and contains 99 numbers.

FH.

FUNGI ITALICI EXSICCATI. Fasc. I. Numbers 1-50. 1914.

Traverso, Giovanni Battista (1878-1955)

Notes: This title was noted in Herbarium 1: 286, 1913 where it was dated 1914. It was advertised in *Mycotheca Italica* as the continuation of that series.

FUNGI LUSITANICI A CL. MOLLER LECTI. CONTRIBUTIONES AD FLORAM MYCOLOGICAM LUSITANIAE. Fasc. 1. Numbers 1-78 (and extras). 1889.

Berlese, Augusto Napoleone (1864-1903), Saccardo, Francesco (1869-1896) and Roumeguère, Casimir (1828-1892).

Notes: New species were described in Rev. Mycol. 11: 117-124, 1889. Descriptions were also included on the labels. New taxa follow: no. 19. *Eutypella minuta* Berl. & F. Sacc., no. 22. *Rosellinia amblystoma* Berl. & F. Sacc., no. 25. *Anthostoma anceps* Berl. & F. Sacc., no. 33. *Apiospora striola* (Pass.) Sacc. var. *minor* Berl. & F. Sacc., no. 34. *Sphaerella collina* Sacc. & Speg. form *caulicola*, no. 48. *Leptosphaeria conimbricensis* Berl. & F. Sacc., no. 50. *Pleospora pustula* Berl. & F. Sacc., no. 57. *Phyllachora cyper* Rehm form *donacis*, no. 68. *Sphaeropsis minuta* Bell. & L. Sacc.

Specimens discussed by these authors earlier (Rev. Mycol. 9: 161 bis-165 bis, 1887) were not included in this set; at least they are not in FH copy.

References: TL-2/1:197.

FH, UPS.

FUNGI NOVA-CAESAREENSES. Cent. 1. Numbers 1-100. 1878.

Ellis, Job Bicknell (1829-1905)

According to Stevenson, this was a recalled set. In a letter to Farlow, dated February 21, 1878, Ellis wrote, "I am now busy putting up a series of Exsiccate Fungi of N. Jersey....I will send you the list of species in Cent. 1. "Fungi Nova Caesareenses" which is now nearly ready. The printing for Cent. II is about done...The price of each Century will be $5.50." Several letters followed in which Ellis states Martindale's opinion that the notes for the exsiccata should be in English rather than Latin. On Apr. 2, 1878 Ellis states that only Farlow's and Martindale's copy has been delivered. He assembled 10 copies of century 1 and 20 of century 2. On April 5 he stated that he would change the name. There followed a series of letters discussing mechanics and arrangements involving a partnership venture. Farlow gave Ellis support and financial assistance in preparing the North American Fungi.

References: Stevenson p. 99-100, TL-2/1: 742.

FH.

FUNGI PARASITICI EXSICCATI PLANTARUM CULTARUM HUNGARIAE. Ser. 1-3. 1902-1904. Grinád., Hungary.

Posch, Karl (-   )

DATES OF PUBLICATION: Hedwigia.

Ser.	
1	Hedwigia 42: (63). 1903.

Note: This was apparently also issued under the following names: Pilzparasitäre Krankheiten ungarischer Kulturpflanzen in natürlichen Präparaten.

A magyargandasági növényeken elforduló gombabetegségeknek természetes praeparatumokban való kiadása.

I have never seen this set and know of it only from the mention in Hedwigia.

FUNGI POLONICI EXSICCATI. Numbers 1-650. [1921].

Petrak, Franz (1886-1973).

DATE OF PUBLICATION: Apparently received as a single lot at FH in 1921.

Notes: Label titles were printed but all other information was handwritten There is no indication of its issuance in units. It was probably not a uniform set. See TL-2/4: 205.

FH, S.

FUNGI RARIORES EXSICCATI.

Romell, Lars (1854-1927)

Notes: This may not have ever been published. It is advertised in Cent. II of Romell's Fungi exsiccati praesertim scandinavici and was mentioned in Hedwigia 35:(31). 1896.

FUNGI WASHINGTONAE.

Grant, John Marshall (1849-1934)

Stevenson p. 173 says: "None of the mycological herbaria of the Americas have admitted to possession of a set of this material except BPI which has two sets of uncertain contents." FH has material which has been inserted in the general herbarium.

FUNGI WISCONSINENSIS EXSICCATI. Decades 1-17. Numbers 1-170.

Davis, John Jefferson (1852-1937)

Decade		Received at FH	Received at BPI
1	1-10	16 Mar 1916	Mar 1916
2	11-20	16 Mai 1916	Mai 1916
3,4	21-40	22 Mai 1917	Mar 1917
5	41-50	18 Mai 1918	Mar 1918
6,7	51-70		
8	71-80	14 Apr 1920	Apr 1920
9,10	81-100	10 Feb 1922	Feb 1922
11	101-110	22 Jun 1922	Jun 1922
12	111-		
16,17	150-170	collected 1932	May 1933

Notes: This set was initiated to distribute material from the University of Wisconsin Herbarium. Stevenson provides an extended commentary.

References: Stevenson p. 97-98, TL-2/1:602.

FH, BPI (no. 1-170), CUP.

GENERA FUNGORUM EXSICCATA. Numbers 1-100. Toulouse.

Roumeguère, Casimir (1828-1892)

Notes: The only reference to this title was found in Lindau and Sydow no. 23104 and Bot. Kal. 1899. p. 120.

GERMAN UREDINEAE. GERMAN COLLECTION OF UREDINAEAE. Numbers 7570-7675, 7759-7795, 8944-9067.

Poeverlein, Hermann (1874-1957)

DATE OF PUBLICATION: Unknown. Collections date from the 1920's. The material was not accessioned at FH until Jan. 21, 1951.

Notes: Probably not an exsiccata in the strict sense but may have been a part of the Flora Bayerns. Labels are printed with handwritten additions. The numbering sequence is that of some large series.

FH.

HERBARIUM BRASILIENSIS.

Ule, Ernst Heinrich George (1854-1915)

Notes: Many collections are in the Farlow general collection. New species were described by Hennings and Rehm.

References: Gola p. xi.

HERBARIUM FLORAE CRYPTOGAMICAE AUSTRIACAE. Cent. 1-11. 1841-1846. Prague.

Opiz, Philipp Maximilian (1787-1858)

Notes: This is probably the title of a unique set.

References: Lindau and Sydow number 19530. Sayre 19:39. Maiwald p. 138.

HERBARIUM FLORAE CRYPTOGAMICAE EUROPAEAE. Cent. 1-3. Numbers 1842-1844. Prague.

Opiz, Philipp Maximilian (1787-1858)

Notes: Known only by title.

References: Lindau and Sydow 19531. Sayre 19:39.

HERBARIUM FLORAE CRYPTOGAMICAE UNIVERSALIS. Cent. 1-3. 1841-1846. Prague.

Opiz, Philipp Maximilian (1787-1858)

Notes: Known only by title.

References: Lindau and Sydow number 19529. Sayre 19: 38. TL-2/3: 839.

HERBARIUM RHENANUM.

Nees von Esenbeck, Theodor Friedrich Ludwig (1787-1837)

Notes: This title was listed in Lindau and Sydow (18850) but I have no record of its contents.

HERBARIUM VIVUM PLANTARUM OFFICINALIUM. 1785. Hanover.

Roth, Albrecht Wilhelm (1757-1834)

References: Lindau and Sydow #22950. TL-2/4: 916.

HERBIER BARBEY-BOISSIER. Numbers 1-2685.

Chodat, Robert Hippolyte (1865-1935)

Notes: This is not a uniform set but it contains many Fuckel collections and often portions of Fuckel's *Fungi Rhenani* collections were included.

References: Stafleu and Cowan 1:496. Stevenson p. 80-81. TL-2/1: 496.

FH (dist.)

HERBIER CRYPTOGAMIQUE DE LA COTE d'OR.

Fautrey, François (1833-1905)

Notes: Only one entry in Hedwigia 37:(144), 1898 has been noted. Fungi were said to be included. I have never seen material. It is perhaps not a regular set.

References: Lindau and Sydow number 8389.

HORTUS SICCUS BRITTANICUS, BEING A COLLECTION OF DRIED BRITISH PLANTS, NAMED ON THE AUTHORITY OF THE LINNAEAN HERBARIUM AND OTHER ORIGINAL COLLECTIONS. Fasc. 1-19. Numbers 475. 1793-1802. London.

Dickson, James (1738-1822)

Note: Sayre, p. 15, lists nonvascular cryptogams for this set. No fungi were included in this set. TL-2/1: 644.

KANSAS FUNGI. Fasc. 1. Numbers 1-100. 1912. Manhattan, Kansas.

Roberts, Herbert Fuller (1879-1937)

DATES OF PUBLICATION: See Stevenson p. 345-346.

Notes: Stevenson reports only two sets extant; one at BPI and another at KSC.

KRYPTOGAMEN-HERBARIUM. INNEHÅLANDE 100 ARTER LÄGRE KRYPTOGAMER, FÖRDELADE PÅ 35 ARTER MOSSOR, 10 ARTER ALGER, 25 ARTER LAFVAR OCH 30 ARTER SVAMPAR. Stockholm (Gullberg & Halleberg). 1895.

Hamberg, Knut Herman Rudolf (1873-1920)

Notes: I have not seen a copy of this set. Sayre reported on a set in UPS.

References: Sayre 19:27, Lindau and Sydow no. 11057a, TL-2/2:33.

KRYPTOGAMENSAMMLUNG FÜR SCHULE UND HAUS. 500 SPECIMENS WITH TEXT. Dresden (Heinrich). 1855.

Rabenhorst, Gottlob Ludwig (1806-1881)

Note: I have not seen material from this set, but it was apparently not meant to be a reference set for professional use. A general discussion of the set is given in Bot. Zeitung 13(13):224-226. 1855. A text was issued separately as "Text zur Kryptogamensammlung für Schule und Haus von Dr. L.

Rabenhorst" in 1855.

See Sayre p. 42. TL-2/4: 462.

KRYPTOGAMENSAMMLUNG SYSTEMATISCHE UEBERSICHT DAS REICH DER KRYPTOGAMEN IN GETROCKNETEN EXEMPLAREN. Section I. Fungi 1-100. 1843.

Rabenhorst, Gottlob Ludwig (1806-1881).

Notes: See Bot. Zeit. 1: 30-34, 1843 for list of included species. Fungi are included. I have not seen a copy of this set.

References: Lindau and Sydow no. 21614. Sayre p. 41. TL-2/4: 461.

KRYPTOGAMEN-TYPEN. Numbers 1-120. 1881. Hamburg (Vetter)

Hennings, Paul (1841-1908).

DATES OF PUBLICATION: Hedwigia 1881 (?).

Notes: I can find no evidence of the existence of a set of specimens under this title. It was cited in TL-2/2: 157. and was said to have a text and 22 plates. It was not seen by Stafleu and Cowan. It was also cited in Bot. Centralbl. 2(7): 224. 1881 where it was offered for 12 Marks. It seems as though it must have been intended as a study set.

References: Lindau and Sydow number 11835. TL-2/2: 157.

THE LACTARIAE OF NORTH AMERICA. Fasc. 1-2. Numbers 1-50. Jan. 1910. Brooklyn, NY.

Burlingham, Gertrude Simons (1872-1952).

DATES OF PUBLICATION: Stevenson p. 68-69.

Notes: Stevenson did not consider this a standard set because of its non-uniformity.

References: TL-2/1:413; Stevenson p. 68-69.

BPI.

MYCOLOGIA NICAEENSIS. Numbers 1-69. 1886.

Barla, Joseph Hieronymus [Jerome] Jean Baptiste [Giambattista] (1817-1896).

DATES OF PUBLICATION: From Farlow copy.

Notes: This is not a regular set. The date given above is the date at which the set was indexed at FH. Labels were printed with title only.

References: TL-2/1:121.

FH, UPS.

MYXOMYCETES OF NEW ENGLAND.

Cummings, Clara Eaton (1865-1906).

Notes: Not considered by Stevenson (p. 96) to be an exsiccata. TL-2/1:571.

NOVITATES BRASILIENSES. Numbers 1-15 and Nachtrag 16.

Rehm, Heinrich (1828-1916) and Rick, Johann [João] (]869-]946)

Notes: In the Farlow Herbarium accession list, it is stated that specimens belonging to a series with this title were inserted in the herbarium. No specimens have been located, but the list below was taken from Broteria 5: 223-228.

1. *Boletus mutabilis* Peck var. *Austro-american* Rick
2. *B. tropicus* Rick
3. *Leptonia similis* Peck
4. *Tomentella brasiliensis* Rick
5. *Trichobelonium virgineum* Rick
6. *Cyanocephalium flavidum* Rick
7. *Schizostoma incongruum* Rehm
8. *Hysterium angustatum* var. *lophioides* Rehm
9. *Diatrype levcoxantha* Rehm
10. *Gibbera Riograndensis* Rehm
11. *Lizonia leguminis* Rehm
12. *Broomella richiana* Rehm
13. *Microphyma rickii* Rehm
14. *Chlorospleniella collematoides* Rehm
15. *Coryne albido-aurantiaca* Starb.
16. *Hypoxylon albotectum* Rehm

References: Rehm, H., and J. Rick. 1906. Novitates Braziliensis. Broteria 5: 223-228. 1906.

PACIFIC SLOPE FUNGI.

Baker, Charles Fuller (1872-1927)

Notes: Not considered an exsiccata by Stevenson p. 23-27. TL-2/1:103.

FH (dist.), BPI (no. 1-4049), UPS (dist.)

PHYTOPATHOLOGISCHES HERBARIUM. Material Vorwiegend aus Hessen-Nassau Stammend.

Schulz, Hermann (1882-1970)

Note: Known only from Weigel's comments (Herbarium 1:262. 1912). The set was said to consist of five series. Series I was to contain parasitic fungi and was to have been made up of 10 fascicles.

PHYTOPLACIUM EHRHARTIANUM, CONTINEUS PLANTAS, QUAS IN LOCIS EANIM NATALIBUS COLLEGIT ET EXSICCAVIT. Decades 1-10. Numbers 1-100. 1780-1785. Hannoverae.

Ehrhart, Jacob Friedrich (1742-1795)

Notes: No fungi were included.

References: Lindau and Sydow no. 7671, 7674f. Sayre 19:18; TL-2/1:731.

UPS

DIE PILZE DER GARTENGEWÄCHE U. DER LANDWIRTSCHAFTLICHEN CULTURGEWACHSE IN GETROCKNETEN EXEMPLAREN MIT ABBIDLUNGEN DER SPOREN. 50 Arten auf 29 Cartonplatten unter Glas. 1872-82.

Thümen, Felix Karl Albert Ernst Joachim de (1839-1892).

Note: This title was offered in Herbarium 1: 132. 1910. I have not seen it.

DIE PILZE DER OBSTBÄUME IN GETROCKNETEN EX., MIT ABBILDUNGEN DER SPOREN. 25 Artenauf, 15 Cartonplatten unter Glas. 1874-80.

Thümen, Felix Karl Albert Ernst Joachim de (1838-1892).

Note: This title was offered in Herbarium 1:132. 1910. I have seen neither the set nor specimens.

DIE PILZE DES WEINSTOCKES. Numbers 1-25. 1877. Klosterneuburg.

Reichardt, Heinrich Wilhelm (1835-1885).

Note: I have not seen specimens of this series. The British Museum accession list has this title under Thümen and it reads, "25 fungi (1878): purchased at various times 1872-84."

References: Lindau and Sydow number 22010.

PLANTAE BOLIVIANAE A MIGUEL BANG LECTAE.

Bang, Miguel (1853)

According to Stevenson (p. 31-32) this is not an exsiccata in the strict sense. TL-2/1: 114.

PLANTAE SURINAMENSIS.

Hostmann, F. W. (1794-1864) and Kappler, August (1815-1887)

Notes: Stevenson (p. 199) states that this is not known as a set.

RELIQUIAE BETHELIANAE.

Note: This was an irregular and unnumbered set. See Stevenson, p. 50.

FH, CUP

RELIQUIAE LIBERTIANAE. Types Originaux Don Du Jardin. Royal de Bruxelles, 1879-1881.

Note: This is not a regular numbered set. It was assembled after Libert's death and apparently distributed by the Herbier du Jardin Botanique de Bruxelles. Some specimens are numbered with "Coll. Libert no. suppl." Most labels are handwritten. Numbers range to over 1000. See TL-2/3: 6.

RELIQUIAE MYCOLOGICAE WESTENDORPIANAE.

Saccardo, Pier Andrea (1845-1920).
Marchal, Elie (1839-1923).

Note: ±176 specimens. New species were described in reference listed below.

References: Rev. Mycol. (Toulouse) 7: 140-149. 1885.

RUST FUNGI OF JAPAN. Numbers 1-901. 1933.

Hiratsuka, Naohide (1903-)

DATES OF PUBLICATION: The only published comment seen is in Hedwigia 73: (197). 1933.

Notes: The set has mimeographed labels with handwritten numbers. It seems to have been primarily an exchange set. It may be widely distributed in plant pathology herbaria.

FH (dist.).

SAMMLUNG VON NIEDERLÄNDISH OST-INDISCHEN GALLEN. Series 1. Numbers 1-25. 1912. Semarang-Java.

Leeuwen, Willem Marius Docters van (1880-1960).

DATES OF PUBLICATION: Only Reference seen Hedwigia 57: (76). 1916.

A SET OF ENGLISH AGARICS COLLECTED AND MOUNTED BY MR. CH. E. HARKEY-SMITH. Fasc. 1-4. Unnumbered. 82 specimens. 1907-1911.

Harkey-Smith, Charles E. (-)

DATES OF PUBLICATION: Recorded below are the dates from manuscript lists of species which are with the FH set.

Fasc.	
1	Sep 1907
2	Dec 1907
3	8 Feb 1910
4	17 Nov 1911

Notes: Specimens were issued unnumbered and there is no evidence of uniformity between sets. FH set was numbered after receipt.

FH

SVENSK SVAMP-HERBARIUM, OMFATTENDE I SVERIGE FÖREKOMMANDE PARASITSVAMPAR. Fasc. 1. Numbers 1-50. 1880. Stockholm.

Eriksson, Jakob (1848-1931).

Only citation known given by TL-2/1:798, which cites only set at S.

SYSTEMATISCHE SAMMLUNG CRYPTOGAMISCHER GEWÄCHSE. Fasc. 1, 2. Numbers 1-174. 1796, 1797. Göttingen.

Schrader, Heinrich Adolph (1767-1836).

Notes: No fungi were included.

TYPENSAMMLUNG VON PILZEN.

Bail, [Carl Adolph Emmo] Theodor (-)

Note: This is known only as a title listed in Flora 41:792. 1858.

USTILAGINEAE OF NORTH AMERICA.

Zillig, Herman (1893-1952)

According to Stevenson (p. 528), this was an abandoned project.

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THE NOMENCLATURE OF FOSSILS AS FUNGI

DON R. REYNOLDS

Natural History Museum
900 Exposition Boulevard
Los Angeles, California 90007

Abstract: Fossil fungi are often missing the structures that would conclusively place them in a non-fossil taxon. Two taxonomic trends are to recognize these fungi as fossil form-taxa based on the data at hand, or to make correlations with non-fossil fungi by deducing the missing parts. Both approaches encounter nomenclatural problems. The current version of International Code of Botanical Nomenclature is reviewed with a focus on fossils and fungi. Revision of the ICBN is proposed to create a special status for them as paramorphs in order to better recognize fossil fungi as fungi.

KEY WORDS: fossil fungi, paramorph, International Botanical Code of Nomenclature Article 59.

I. INTRODUCTION

Fossils have an identity problem as fungi. They usually must be characterized without the essential characters of non-fossil counterparts. The soft parts of the reproductive structure, such as zoospores in the sporangium or ascospores in the ascus, are rarely preserved. Organelles and other cytoplasmic components are difficult to discern, even if present. Spores and hyphae are commonly found as whole or partial structures dispersed throughout a preserving matrix without association with the source of origin such as conidiogenous cell, a ascus, or a basidium. This situation leads to what Fournier (1981) refers to as, "the hazardous ways of taxonomy and scientific nomenclature."

I.a. Taxonomy

The taxonomic literature deals with fossils as fungi presents two evident taxonomic trends. One is that of the form-taxon sensu stricto -- the fossils are fungous artifacts. The number of cells, the shapes of cells, and their surface features are the major character categories (Elsik, 1981; Locquin, 1982; Sheffy and Dilcher, 1971). This trend results in a classification system completely devoid of natural relationships, yet one of fundamental practicality. The pseudo-taxa of Donk's (1960) conventional system are found here as are the form-taxa of Hennebert's (1972) anatomical system.

The second taxonomic trend approaches the holomorphic species of the botanical system=ICBN system (Hennebert, 1972) as nearly as possible (Pirozynski and Weresub, 1979). The missing characters of fossil fungous artifacts are to be deduced by a comparison of the extinct material with the apparent extant homologue. (Analogue is an inappropriate term here because evolutionary modification of the organism is implied not to have occurred.) The investigator may pronounce the fossil fungus as merely an older collection than its non-fossil comparative (Bradley, 1931; Wolf, 1969). Or, alternatively, a new taxon must be described in which the missing parts have been supplied for the type description by deduction (Lange, 1969), even though lacking in the type material.

I.b. Nomenclature

Nomenclatural problems also stem from the same lack of essential characters. A footnote to Preamble 7 as well as Article 13.3 of the 1981 edition of the ICBN define a fossil as a taxon with a name based on a fossil type and a non-fossil as a taxon with a name based on a non-fossil type.

Although the ICBN does not precisely define a fungus, there are explicit guidelines for the recognition of an ascomycete and a basidiomycete in Article 59. Korf (1978) sounds the alarm on the common paleomycological practice of designating teleomorphic status to fossil taxa without the presence of an ascus or a basidium. Can this problem be dismissed by falling back on the tenet that a type does not have to possess all the characteristics of a population (Article 7.2)? Is this a matter of "loose standards" or is there need to modify the ICBN to resolve an identity problem commonly encountered in paleomycological practice?

I estimate that 92% of the fossil fungous names designated in Tiffney and Barghoorn (1974) as ascomycetes and basidiomycetes are typified with material which contains neither an ascus nor a basidium. The ICBN question is ostensibly one of priority. It seems that without the ascus or the basidium, such fossil ascomycete and basidiomycete fungous taxa are to be regarded as anamorphic.

I.c. The paramorph

I conclude that the fossil fungous name should have a distinct status. I revive the term paramorph (para=beside) (Huxley 1940) to emphasize the identity problem fossils have as fungi in contrast to the holomorph (holo=whole or complete). The term should reflect the absence of parts as well as those which are only partially present. W. Gams (personal communication) has alternatively suggested the term meromorph (meros=part) to emphasize the fragmentary nature of the material being described.

The paramorph is the fossil fungous morph which lacks the essential characters that allow assignment to a non-fossil taxonomic hierarchy. The usefulness of the paramorphic status is illustrated with the following examples.

Millay and Taylor (1978) gave no name to a chytrid-like paramorph. They found endobiotic and epibiotic sporangia, discharge papillae, and rhizomycelia in heterogenous material. The paramorph resembled five orders of non-fossil fungi.

Schopf (1968, 1970) described two paramorphic species in the genus Eomycetopsis which resembled primative aquatic phycomycetes. The general morphology, coenocytic organization of the mycelium-like growth and the irregularly distributed fungous-like septa suggested the taxonomic relationship.

Agashe and Tibak (1970) gave no name to the paramorph which resembled a synchytridiaceous or oomycetous fungus. Non-septate mycelium, soprangium-like, and oosphere-like structures were seen.

Bradley (1967) reinterpreted a fossil alga (Bradley 1931, 1964) as a fungus. He assigned Entophlyctis willoughbyi to the Order Chytridiales, Family Phlyctidiaceae. The protologue mentioned a sporangium and a germ tube. The taxon is paramorphic because essential characters such as the rhizoidal axis and other essential life cycle features of the designated family are unknown. Lange (1976) discredited the chytrid-like nature of this organism, deeming it a "germling". Nishida and Reynolds (1984) suggested the ascomycete affinity of this paramorph. Teleomorphic or anamorphic status was not ascertained.

Scott (1956) described the paramorphic genus Cryptocolax as a member of the family "Aspergillaceae (Eurotiaceae)." The ascus was deduced in both original species, C. clarensis and C. parvula. The fruitbody was interpreted as a cleistothecium. "Although no traces of the evanescent asci remain, in a few cleistothecia the ascospores are still in their original groups." Scott clearly states, "conidial stage unknown" and "asexual spores unknown", although he illustrated (Fig. 2) a "chain of partially collapsed spores" for C. clarensis. Scott considered the paramorphic taxa apart from non-fossil eurotiaceous taxa because of a missing essential character -- the fruitbody wall structure could not be determined.

Tiffney and Barghoorn (1974) "accepted" many paramorphs as anamorphs in the Deuteromycetes, Moniales, Moniliaceae.

Dilcher (1965) established the fossil genus Shortensis, "for species of the non-fossil genus Manginula Arnaud for which perfect stages are unknown." Shortensis memorabilis was based on a fossil type containing a teleomorph; an anamorph was attributed to the species on the basis of spore-bearing pycnidia being attached to similar hyphae. Lange (1969) "invalidated" the distinction between the two genera on the assumption that Arnaud (1918) misinterpreted the spores in the type material as pycnidiospores rather than ascospores.

Lange redesignated the type species, M. perseae as teleomorphic without examining the type. The teleomorphic fossil Shortensis memorabilis was transferred to Manginula. The holomorphic M. eicherli was described from living, Queensland, Australia material. Two paramorphic taxa, M. osbornii and M. maedifravii were also described. "Spores present cannot be attributed unequivocally to the fruiting bodies, and were therefore discounted. The total of other characters exhibited was considered sufficient to assign each accession to Marginula.

Dispersed spore paramorphs are treated as species or as "non-species." Sheffey and Dilcher (1971) described the paramorph Dicellaesporites levis based on two-celled, uniseptate, smooth spores. Ramanujam and Rao (1978) named the paramorphs Fusiformisporites keralensis and F. elongatus for fusiform to rhomboidal, truncated, striate two-celled spores; two paramorphs were given non-specific status as Fusiformisporites sp., and one as Fusiformisporites ?. Palacios-Chávez (1982) followed the "sp." convention exclusively.

Geel et al. (1983) described paramorphs as non-specific "types", some of which were compared to non-fossil taxa. Fournier (1981) approach to paramorphs was to have a, "type collection", which was, "by no means a collection of holotypes sensu stricto, but of morphotypes that is constantly being revised. Naming of the morphotypes is done by a [trinominal] coding system." My understanding of this approach that the fossil fungi are to be treated as non-species -- spare parts! -- until some critical data mass is reached and a name can be assigned to the subsequently deduced paramorph. This view is found in Paleopalynologic Data-handling Code proposed by Hughes (1978), which, as Schopf (1978) points out, is taxonomic rather than nomenclatural. This system would purportedly avoid ICBN problems for fossils, including fungi, in areas such as such the requirement for a published holotype, the need for a classification scheme, emendation of taxa, among others. Lange's (1976) remark is appropriate here -- "For some progress with the systematics of dispersed spores some compromise between cataloguing and taxonomy seems necessary."

D.L. Dilcher (personal communication) suggested that fossil fungi should have unique rules and standards in the ICBN which are promulgated with a concern for common sense and common usage. Paramorphic status for fossil fungi addresses these nomenclatural needs. For example, necessity created by Article 59 to label all ascomycetes or basidiomycete morphs as holomorphic components, i.e. teleomorphs or anamorphs, would be alleviated.

II. THE ICBN

Those familiar with the ICBN will find the focus on fossils as fungi offers justification for certain proposed changes. Division III.2 provides for permanent oversight committees to represent the nomenclatural interests of specific plant groups. The exceptions and clarifications placed in the ICBN through these committees may be taken as a reflection of a plant group's special nomenclatural problems (Fig. 1). Eighty-one percent of the Articles (Notes and Recommendations are included here) with exceptions or clarifications refer to fungi and/or fossils (hybrids were not considered in this tabulation). Fungi have the largest number of exceptions and clarifications with 31; fossils have the next largest with 17; algae have 16; bryophytes have 9; pteridophytes have 6; and spermatophytes have 10.

The Articles which have exceptions and clarifications for both fungi and for fossils point to areas of overlap.

One such area relates to form-taxa. Specific reference to both fungi and fossils are made on this topic in Articles 3.3, 7.16, and 11.1; reference is made only to fossils in 3.2 and 7.15, and only to fungi in 3.2.N2 and 59. Fossil species may be assigned to form-genera and suprafamilial taxa, although anamorphic species may be assigned any rank.

The overlap in Articles 7.16, 42.2, and 44.2, plus the additional reference to fossils in 7.15 and 38, point to similar exceptional requirements for type validation. Description of fossil and algal taxa must include an illustration. The type of non-fossils may consist wholly of a description under certain circumstances by virtue of Article 9.3.

Several exceptions and clarifications relate to either fungi or to fossils, but in practice have a direct bearing on fossil fungi.

Types consisting of multiple items are mentioned for nonvascular plants in Article 9.1; the application of this rule to fossil fungi is presumed. Reynolds and Dilcher (1984), for example, cite a permanent slide type preparation for the fossil alga Pelicothallus villosus which consists of more than one individual. Article 9.4 refers specifically to disposition of a segmented fossil type. Guide for the Determination of Types #6 concerning the lectotype of a fossil species applies to fossil fungi.

Recommendations 16.A.1, 16.A.2, and 16.A.3 refer to the names of taxa above the rank of family. Fungi are mentioned, but fossils are not. Elsik (1981) and Locquin (1982) followed these guidelines for fossil fungi.

Recommendation 32.E refers to the description or diagnosis of parasitic fungi including the name of the host. Dilcher (1965) included this information in the descriptions of fossil asterinaceous fungi.

Article 59 is the source of another fossil fungous problem. Fossils are not specifically mentioned now, although this Article was originally meant to apply to fossils as well as to fungi. The paradox: if the essential characters of asci or basidia are missing, the fossil fungus is not distinguishable as a teleomorph; if the structure is to be deemed an anamorph by default, how can one know if it is merely an unrecognized teleomorph? Doi (1983) utilized a hopefully abandoned deuteromycetological practice (cf. Ellis, 1971 and 1976) to solve this problem. Fossil fungi were designated as relatives of non-fossil fungi with a trinominal use of non-fossil names. *Mycosphaerella* cf. *M. fagi* (Avers.) Lindau and *Leptothyrium* aff. *L. quercinum* Sacc. were used for two of his new fossil species, although he apparently saw no asci and clearly stated that no ascospores were found in the former, nor were conidia found in the latter. He assigned them anyway to non-fossil higher taxa. Geel et al. (1983) utilized a similar device for dispersed spores.

Article 13.1 eliminates fossil starting point overlap with non-fossil starting points. All fossils start with 31 December 1820 (Sternberg, Flora der Vorwelt, Versuch 1:1-24.t.1-13). Fungous names have a different starting point of 1 May 1753 (Linnaeus, Species Plantarum ed. 1).

Fossils are excepted from the requirement of a Latin description or diagnosis in Article 36.1.

Priority is conferred on non-fossil names by Article 58 if non-fossil and fossil taxa are united. The algae are exempted. This rule implies that the type of a non-fossil genus cannot consist of a fossil specimen. A perusal of Tiffney and Barghoorn (1974) indicates that revisionary work will encounter this problem in fossil taxa which were described prior to the turn of the century.

Article 65.N1 points out that the International Code of Nomenclature of Bacteria gives illegitimate status to a name if it is a later homonym of a name of a fungous taxon; this is presumed to apply to fossil as well as non-fossil fungi.

Fossils and fungi are historically associated in the ICBN. The 1905 version did not deal with fungi separately; Article 9 stated that, "the rules and recommendations of botanical nomenclature apply to all classes of the plant kingdom, reserving special arrangements for fossil plants and non-vascular plants." The antecedence to Article 59 was largely formulated by a group of 27 mycologists headed by G. F. Atkinson. They introduced the fungous terms "form genus" and "form family" into the 1910 version. The 1961 version included a paragraph applying to names of fossils assigned to form-genera. Finally, mention of fossils was deleted from the title of Article 59 in the 1981 version.

Figure 1. Fungous and fossil exceptions and clarifications in the 1983 International Code of Botanical Nomenclature. The numbers correspond to the ICBN numbering system;
▲ = exception or clarification; $\boxed{\blacktriangle}$ = applies to fossils only; $\textcircled{\blacktriangle}$ = applies to non-fossils only;
● = applies to non-vascular plants; shaded areas note the Article which has both fungous and fossil exceptions and clarifications.

	P7	3.2	3.2.N2	3.3	4.N2	7.15	7.16	7.17	7.N1	9.1	9.3	9.4
Fungi	▨ ▲		▲	▨ ▲	▲		▨ ▲	▲	▲	▨ ▲⃝	●	
Fossils	▨ ▲	▲		▨ ▲		▲	▨ ▲			▨ ▲⃝		▲
Algae										▲⃝	●	
Bryophyta										▲⃝	●	
Pteridophyta										▲	●	
Spermatophyta										▲	●	

	9A	11.1	13.1.a	13.1.b/c	13.1.d	13.1.e	13.1.f	13.3	13.6	16.A.1	16.A.2	16.A.3
Fungi	▲	▨ ▲			●			▨ ●	▲	▲	▲	▲
Fossils		▨ ▲					▲⃞	▨ ▲⃞				
Algae	▲			▲		▲		●				▲
Bryophyta			▲					●				
Pteridophyta			▲					●				
Spermatophyta								●				▲

	18.5	18.6	19.7	32.E	33.5	34.2	36.1	36.2	36A	38	39	42.2
Fungi				▲	▲	▲			●			▨ ▲⃝
Fossils							▲			▲		▨ ▲⃝
Algae							▲	●	●		▲⃞	▲⃝
Bryophyta									●			▲⃝
Pteridophyta									●			
Spermatophyta	▲	▲	▲						●			

	42.N	44.2	50.E2	51.2	58	59	59.A.1	59.A.2	65N	73H	7.6	
Fungi	▨ ▲⃝	▨ ▲⃝	▲		▨ ▲	▲	▲	▲	▲	▲		
Fossils	▨ ▲⃝	▨ ▲⃝			▨ ▲						▲	
Algae	▲⃝	▲⃝			▲⃞				▲			
Bryophyta	▲⃝	▲⃝			▲							
Pteridophyta					▲							
Spermatophyta				▲	▲							

Recommendation 32.E refers to the description or diagnosis of parasitic fungi including the name of the host. Dilcher (1965) included this information in the descriptions of fossil asterinaceous fungi.

Article 59 is the source of another fossil fungous problem. Fossils are not specifically mentioned now, although this Article was originally meant to apply to fossils as well as to fungi. The paradox: if the essential characters of asci or basidia are missing, the fossil fungus is not distinguishable as a teleomorph; if the structure is to be deemed an anamorph by default, how can one know if it is merely an unrecognized teleomorph? Doi (1983) utilized a hopefully abandoned deuteromycetological practice (cf. Ellis, 1971 and 1976) to solve this problem. Fossil fungi were designated as relatives of non-fossil fungi with a trinominal use of non-fossil names. _Mycosphaerella_ cf. _M. fagi_ (Avers.) Lindau and _Leptothyrium_ aff. _L. quercinum_ Sacc. were used for two of his new fossil species, although he apparently saw no asci and clearly stated that no ascospores were found in the former, nor were conidia found in the latter. He assigned them anyway to non-fossil higher taxa. Geel et al. (1983) utilized a similar device for dispersed spores.

Article 13.1 eliminates fossil starting point overlap with non-fossil starting points. All fossils start with 31 December 1820 (Sternberg, Flora der Vorwelt, Versuch 1:1-24.t.1-13). Fungous names have a different starting point of 1 May 1753 (Linnaeus, Species Plantarum ed. 1).

Fossils are excepted from the requirement of a Latin description or diagnosis in Article 36.1.

Priority is conferred on non-fossil names by Article 58 if non-fossil and fossil taxa are united. The algae are exempted. This rule implies that the type of a non-fossil genus cannot consist of a fossil specimen. A perusal of Tiffney and Barghoorn (1974) indicates that revisionary work will encounter this problem in fossil taxa which were described prior to the turn of the century.

Article 65.N1 points out that the International Code of Nomenclature of Bacteria gives illegitimate status to a name if it is a later homonym of a name of a fungous taxon; this is presumed to apply to fossil as well as non-fossil fungi.

Fossils and fungi are historically associated in the ICBN. The 1905 version did not deal with fungi separately; Article 9 stated that, "the rules and recommendations of botanical nomenclature apply to all classes of the plant kingdom, reserving special arrangements for fossil plants and non-vascular plants." The antecedence to Article 59 was largely formulated by a group of 27 mycologists headed by G. F. Atkinson. They introduced the fungous terms "form genus" and "form family" into the 1910 version. The 1961 version included a paragraph applying to names of fossils assigned to form-genera. Finally, mention of fossils was deleted from the title of Article 59 in the 1981 version.

III. CODE REVISION

The 1983 edition of the ICBN was edited to cross reference several major revisions adopted by the 13th International Botanical Congress in 1981. The apparent purpose of the many changes was reduction of consequent redundant or perhaps confusing language. One such change was the elimination of the reference to fossils in Article 59; the title now reads, "Names of fungi with a pleomorphic life cycle." I believe that the mention of fossil fungi should be restored to Article 59, but in such a way as to effectively deal with the "identity problem" of fossils as fungi. Therefore, I propose a modification of the ICBN to recognize the following guidelines.

1. Every fossil fungous artifact should be accorded a name should a taxonomist desire to give it one.

2. Fossil fungi are to have a special status as paramorphs. This generative neutral designation would nomenclaturally recognize the fossil fungi that are thought to have affinities with ascomycetes and basidiomycetes, as well as other fungous groups, but are not typified with material that has the essential characters such as the ascus or the basidium. Biologically, this status would emphasize the presence of a few correlative characters that suggest natural relationship with non-fossil fungi, but still allow for a practical, taxonomically referable system based on the characters in hand.

Two ways to incorporate the paramorphic status into the code are apparent.

1. Change the code to read: "Fossil fungi are to be recognized as fungi for nomenclatural purposes." Application of all the ICBN non-fossil provisions to fossil fungous names would necessitate all manner of changes related to valid and effective publication, and possibly to the starting dates.

2. Revise Article 59. As pointed out above, mention of fossils was deleted from the current version of the ICBN.

The following are the suggested revisions of the 1981 version of the International Code of Botanical Nomenclature related to fossils and fungi. The numbering is rearranged; the deletions are underlined; the changes are in upper case letters.

ARTICLE 59 NAMES OF FUNGI

59.1 THE FUNGOUS TAXON IN ALL ITS MORPHS IS THE HOLOMORPH. THE MEIOTIC SEXUAL MORPH IS THE TELEOMORPH. A MITOTIC ASEXUAL MORPH IS THE ANAMORPH.

59.2 A FOSSIL FUNGOUS TAXON WHICH LACKS THE ESSENTIAL CHARACTERS OF ANY MORPH IS A FORM-TAXON, THE PARAMORPH.

59.3 In ascomycetous and basidiomycetous fungi (including Ustilaginales) with mitotic asexual morphs (anamorphs) as well as a meiotic sexual morph (teleomorph), the correct name covering the holomorph (i.e. the species in all its morphs) is -- except for lichen-forming fungi -- the earliest legitimate name typified by an element representing the teleomorph, i.e. the morph characterized by the production of asci/ascospores, basidia/basidiospores, teliospores, or other basidium-bearing organs.

59.4 For a binary name to qualify as a name of AN ASCOMYCETOUS OR BASIDIOMYCETOUS holomorph not only must its type specimen be teleomorphic, but also the protologue must include a diagnosis or description of this morph (or be so phrased that the possibility of reference to the teleomorph cannot be excluded).

59.5 If THE requirements in 59.3 AND 59.4 are not fulfilled, the name is that of a form-taxon and is applicable only to the anamorph represented by its type, as described or referred to in the protologue. The accepted taxonomic disposition of the type of the name determines the application of the name, no matter whether the genus to which a subordinate taxon is assigned by the author(s) is holomorphic or anamorphic.

59.6 The priority of names of ASCOMYCETOUS AND BASIDIOMYCETOUS holomorphs at any rank ARE not affected by the earlier publication of names of anamorphs OR PARAMORPHS judged to be correlated morphs of THESE holomorphs. LIKEWISE THE PRIORITY OF NAMES OF THEIR ANAMORPHS AT ANY RANK ARE NOT AFFECTED BY THE EARLIER PUBLICATION OF NAMES OF PARAMORPHS JUDGED TO BE CORRELATED MORPHS OF THESE ANAMORPHS.

59.7 (=59.6)

59.A.1. When a new morph of a fungus is described, it should be published either as a new taxon (e.g. gen. nov., sp. nov., var. nov.) whose name has a teleomorphic type, or as a new anamorph (anam. nov.) whose name has an anamorphic type, OR AS A NEW PARAMORPH (PARAM. NOV.) WHOSE NAME HAS A PARAMORPHIC TYPE.

In reality the title of Article 59 is a misnomer. Pleomorphism is underlined in the ICBN. Article 59 merely reflects the special focus that the ICBN gives to ascomycetes and basidiomycetes over fungi such as chytrids which can have a teleomorph and an anamorph in the life cycle. Patent awkwardness stems from the philosophical tenet accepted in Article 59.2 that every anamorph has its teleomorph (Weresub and Pirozynski, 1979). Recommendation 59.A.1 extends permission to name the teleomorph and the anamorph of all fungi. Fossils as fungi reflect the "form-taxonomy" created by Article 59.

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FOLIICOLOUS ASCOMYCETES. 6.
THE CAPNODIACEOUS GENUS LIMACINIA

DON R. REYNOLDS

Natural History Museum
900 Exposition Boulevard
Los Angeles, California 90007

SUMMARY

The sooty mold ascomycete genus Limacinia Neger is rescued from nomen dubium status. An emended description is given based on material collected in the type locality, Juan Fernandez Islands (Mas a Tierra), Chile.

Key words. Sooty mold, ascomycete, Capnodiaceae, Limacinia, Metacapnodium, Ophiocapnocoma.

Limacinia fernandeziana Neger was described from material found in the Juan Fernandez Islands (Mas a Tierra and Mas a Fuera) located in the Pacific Ocean off the coast of Chile (Johw, 1896). This material, the type for the generic name, was based on a sooty mold collection comprised of a teleomorph and an asexual reproductive states. The generic name is derived from the resemblance of one of the asexual species to the stylomatophoran eye of an indigenous slug, Limax.

In 1971, on a visit to one of the Juan Fernandez Islands (Mas a Tierra), I confirmed the abundance of Limacinia fernandeziana on various elements of the vascular plant flora. The slugs were also evident in the sooty mold growth.

F. W. Neger (Johow, 1896) observed that the perithecia were found in groups of two or three in the interior of a dense mycelium. He noted that each of the ascocarps contained five to ten or more asci, and that only two or three mature eight-spored asci comprised the hymenium at any one time. The illustration with Neger's description included two ascocarps in Figures 1 and 2 and three hymenial elements in Figures 2, 3 and 4. The young asci are illustrated as having thickened walls. Figure 4 is labeled as, "a paraphysis (rudimentary and sterile ascus)." The paraphysis mentioned is understood as an ascus in the initial stages.

The ascospores were described as immature when two celled and colorless and mature when they were four-celled and brownish-black, 25-30 μm in length.

The neotypic and other collections I made from the type locality contained ascocarps which fit Neger's general concept of Limacinia. The fruit bodies bearing asci are produced within a dense aerial growth of mycelium, which becomes compacted with age (Fig. 1.A). The hymenium eventually contains fissitunicate asci that eventually bear only mature ascospores (Figs. 2,3), and hence the initial developmental stages of the ascospores incorporated by Neger in his description are not commonly seen. The ascospore initials are hyaline (Fig. 2.A). Septation is initially macrocephalic (Eriksson, 1981). A transseptum forms in the initial which divides it into two more-or-less equal hemispores. A subsequent formation of two more transsepta aportion the spore into unequally divided hemispores (Fig. 2.B-C). The terminal cells of the ascospores from this point can be regarded as meristematic, or perhaps as the equivalent of a hyphal tip with determinant growth. The hyaline walls of the terminal cell are thinner than the original cells of the now divided ascospore initial. The first-formed cells of the ascospore initial begin to acquire wall pigmentation at this 4-celled point (Fig. 2.B-D). The transsepta now produced are initially folded and become flattened as the cell wall acquires pigmentation and the diameter of the cell slightly increases (Fig. 2.E,G-I). No more growth occurs when the ascus contained ascospore has from 9 to 11 septa; all of the wall material is uniformly pigmented (Fig. 2.J). Occasionally the still hyaline and thin walls of the terminal ascospore cell will be seen to be collapsed in dried material giving a truncated appearance. The mature ascospore is wider in the middle at the site of the ascospore initial than at the distal ends which were produced by the growth of the ascospore end cells.

These observations on the sooty mold ascomycete found in the type locality material differ from Neger's type description of the details of the ascospore. I believe that Neger observed only immature ascospores that had developed to the four-celled stage where the wall pigmentation first begins to show. This supposition is supported by his description of the hymenium as containing mostly asci with the hyaline ascospore initials and only a few asci with pigmented ascospores. The hymenium of my collections usually contained asci with fully developed ascospores and rarely asci with spores developed to the four-celled stage (Fig. 3.A). Younger ascocarps do not contain asci with the 9-11 celled ascospores.

The original description of Limacinia fernandeziana was based on a collection containing several sooty mold reproductive states. The protologue of the teleomorph associated with the name Limacinia is imprecise. A study of the newly designated neotype from the type locality and of material collected in the Scottish type locality of Capnodium juniperi Plowright and Phillips substantiates rejection

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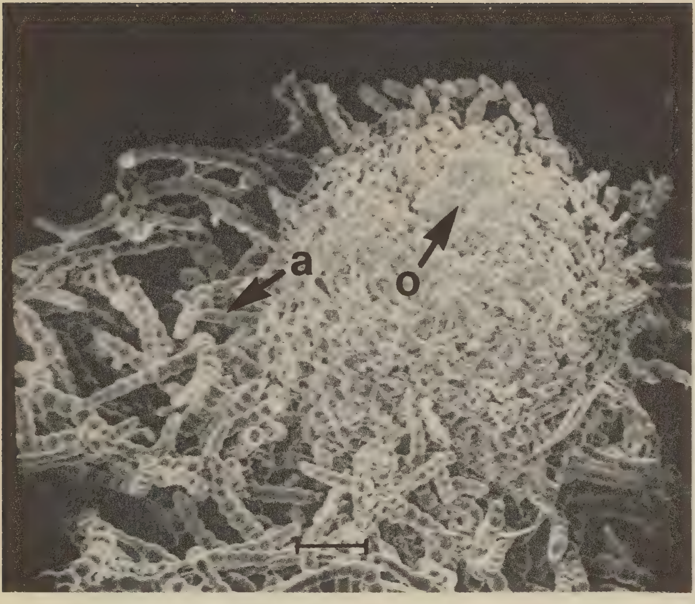
Figure 1. Limacinia fernandeziana. A. Ascocarp nestled in a dense aerial mycelium Bar=8 μm. B. Ascocarp a= appendage. o= ostiole Bar=5 μm.



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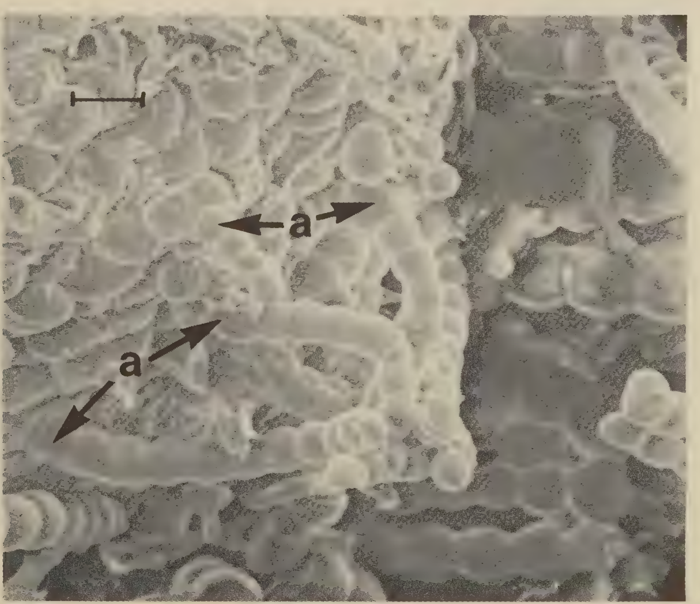


B

(Reynolds, 1971) of the conjecture that the sterile elements found in the ascocarp of *Limacinia* are pseudoparpahyses (Corlett, Hughes and Kaufert, 1973) which are characteristic of the Pleosporaceae (Luttrell, 1951); they are hamathecial periphysoids (Eriksson, 1981) similar to those noted in the type species of *Capnodium* (Reynolds, 1978).

The concept of *Limacinia* has been apparently modified without first-hand knowledge of the Neger type material, or in some cases it was based on examples other than the holotype. The name *Limacinia* Neger has been subsequently applied to sooty mold ascomycetes with both hyaline and pigmented ascospores and with glabrous or setose ascocarps (Figure 4).

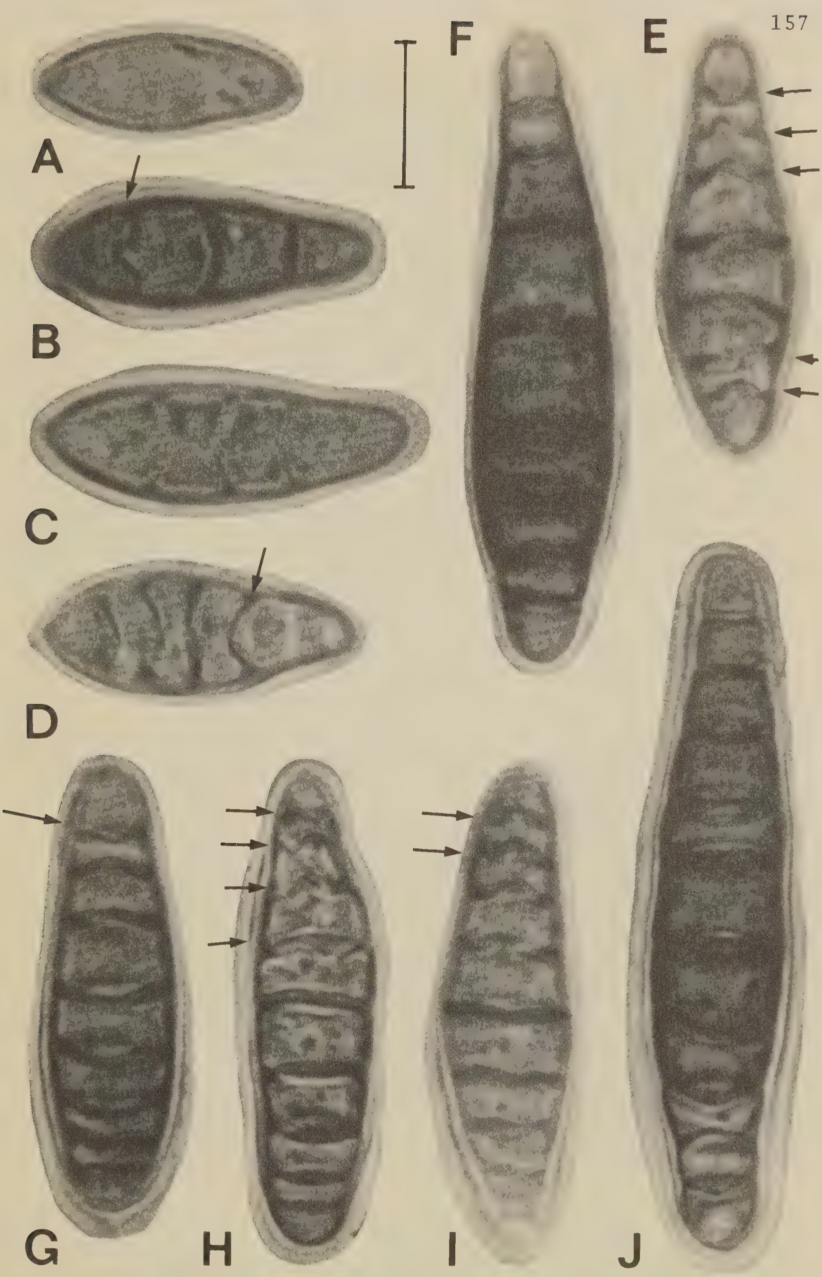
Saccardo and Sydow (1899) published the genus *Limacinia* with a list of 14 recombinations in addition to Neger's type species. They emended the generic description to read: *Capnodium* with perithecium subglobose; spores oblong, less than 3 septate, hyaline to dark, rarely muriform. The list of species were divided into those with glabrous perithecia and those with setose perithecia. The hyaline to dark ascospore was a misuse of Neger's description of the young hyaline ascospore and the pigmented ascospore.

Lindau (1897) described *Limacinia* in the Perisporiales as having brown ascospores of more than two cells. He distinguished the subgenus *Limacinia* by a glabrous ascocarp from the subgenus *Morfea* which was described as having a setose fruit body.

Arnaud (1910) generally accepted P. A. Saccardo's work as a starting point in name priority, but with expressed reluctance. His concept of the genus *Limacinia* genus included an ascospore that was hyaline to dark and an ascocarp that was glabrous or setose. He placed four temperate species, five tropical species and one questionable species from Australia into the subgenus *Limacinia*. Nine species were placed in the subgenus *Morfea*.

Theissen and Sydow (1917) provided a major emendation of P. A. Saccardo's genus *Limacinia*. They created *Phragmocapnias* for Neger's *Limacinia* and used *Limacinia* for capnodiaceous species with traversely septate nonpigmented ascospores. Subsequent authors who have been faithful to this concept are Spegazzini (1918), Mendoza (1925), Clements and Shear (1931), Fraser (1935), Miller and Bonar (1941), Sawada and

Figure 2. *Limacinia fernandeziana*; ascospores teased from asci of neotype. A. Ascospore initial. B. 3-septate ascospore with an immature septum (arrow). C. 3-septate ascospore with mature septa. D. Ascospore with fourth septum forming (arrow). E. 7-septate ascospore with bipolar growth and several immature septa (arrows). F. 8-septate ascospore with younter septa in upper end. G. 8-septate ascospore smaller than the one in F, with immature septa. J. 10-septate ascospore with two immature septa. J. 10-septate spore. Bar=15 μm.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Yamamoto (Sawada, 1959), Batista and Ciferri (1963), and Arx and Muller (1975).

Several authors have provided thoughtful discussions of the deviate use of Limacinia. These include Fisher (1939), Barr (1955), Luttrell (1973), and Hughes (1966, 1972, 1979).

Fisher (1939) excluded many of the genera created by Theissen and Sydow (1917) and Spegazzini (1918). Barr (1955) succinctly reviewed the use of Limacinia. She noted that, "The sooty molds present a confused picture, owing in part to the frequent presence in one collection of several conidial and ascomycetous entities, in part to incomplete or confusing descriptions of species previously named, and in part to divergent viewpoints of the various authors on the limitation of genera and species." She clearly pinpointed the changes in the use of Limacinia from Neger's concept to the major misuses by Theissen and Sydow (1917) and subsequent authors. She provided an emendation based on sooty molds she studied from western North America. This redescription did not mention the examination of Neger's type material. Yet, it is especially noteworthy because Barr did not mix supposed anamorphic data into the holomorpic diagnosis. The mere presence of various reproductive states side by side in a collection was regarded insufficient grounds to warrant pleomorphic assumptions. Unfortunately this excellent attitude toward proof of pleomorphic connections was later modified (Barr, 1983).

Hughes (1966) used Limacinia Neger to include Metacapnodium Spegazzini. Hughes (1979) later decided that Limacinia was untenable as a name because of its misuse beginning with Theissen and Sydow (1917). He believed the concept of this taxon to be confused. He abandoned Limacinia and utilized the Spegazzini's name, Metacapnodium, for it. Thus, he declared Limacinia Neger a nomen dubium.

None of the authors who dealt with Limacinia or its surrogate names apparently saw type material, with the possible exception of Höhnel (1909). Barr (1955) based her observations on western North American material. Batista and Ciferri (1963) based their observations on Brasilian material. Hughes (1979) mentioned that Neger material given to F. von Höhnel, now curated at Herbariun FH, is lacking ascocarps. Carlett, Hughes and Kaufert (1973) based their conclusions on Scottish material. I have unsuccessfully searched herbaria in Europe, South America and North America for material seen by Neger that should serve as the type. I have collected material from the type locality, Juan

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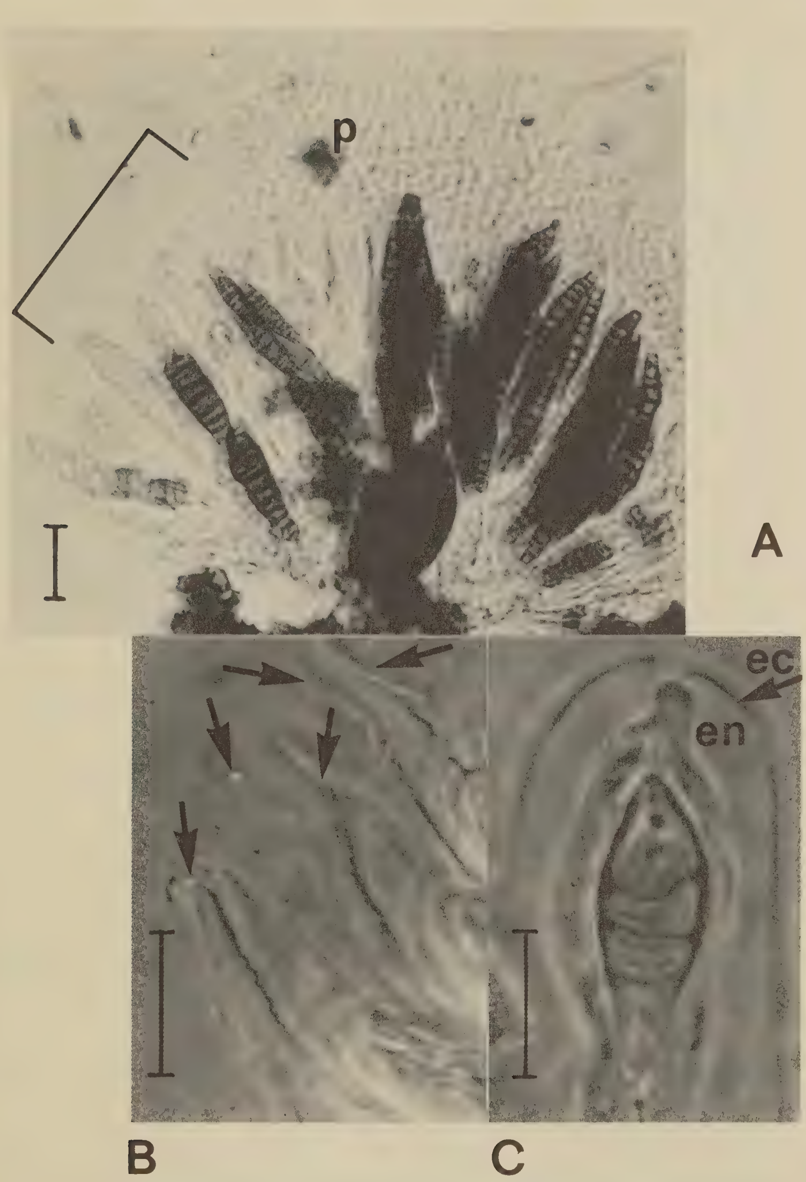
Figure 3. Limacinia fernandeziana neotype. A. Hymenium with mature or discharged asci. p= periphysoids. Bar=40 µm. B. Enlargement of discharged fissitunicate asci from bracketed area in A. Note lumen of extended endotunica (arrows). Bar=15 µm. C. 3-septate ascospore in apex of young ascus. ec= ectotunica, en= endotunica. Bar=15 µm and is oriented on vertical axis of the ascus.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Fernandez Island (Mas a Tierra), which contains a teleomorph that can be ascribed to that seen by Neger. I have seen the type material of *Capnodium juniperi*, the basionym of *Metacapnodium* Spegazzini. In 1973, I collected *Capnodium juniperi* in abundance on *Juniperus communis* from various parts of Scotland, including a site not far from its type locality of Farris, Murayshire. This species belongs to the genus *Limacinia* Neger was *L. juniperi* (Phillips and Plowright) Reynolds comb. nov.; it is my opinion that *Metacapnodium* Spegazzini is therefore a synonym of *Limacinia* Neger. I have also examined *Limacinia multiseptata* Barr, the type species of the Batista and Ciferri genus *Ophiocapnocoma*; it is also my opinion this phragmosporous gens is a synonym of *Limacinia* Neger.

A family has been erected for *Metacapnodium* (Hughes, 1972, 1979) based purportedly on a predeliction for small families. This arbitrary disposition has been utilized by some authors (Barr, 1983; Hawksworth et al., 1983). On the other hand, critical doubt has been expressed (Luttrell, 1973; Kendrick and Dicosmo, 1979; Eriksson, 1981) about the taxa cleaved from the Capnodiaceae sensu lato.

Hughes (1972, 1979) suggested that the *Limacinia* holomorph included anamorphic reproduction. His conclusions on the pleomorphy of *Limacinia* were based on indirectly obtained circumstantial evidence rather than direct evidence (Kendrick and Dicosmo, 1979). The moniliform hypha found in a sooty mold collection which was seen connected to an anamorph was said to be a pleomorphic variant of the *Limacinia* teleomorph, without evidence of organic connection. Hughes (1966, Figure 3G-H; 1967a, Figures 4-I, 7-E; 1967b, Figures 5D, 6C-D; 1968, Figure 5A; 1972, Figure 6-J) illustrated spores bearing phialides similar to those found on a hyphal strand, but not organically connected to a proven teleomorph. The spores were said to be ascospores, although their origin was not ascertained. I prefer direct evidence from experimental data and cannot agree with Hughes's (1979) conclusions concerning his taxonomic criteria.

The following emended description is based on my observations of *Limacinia* in recent collections from Juan Fernandez and other Pacific Islands, neotropical localities, Scotland and various herbaria; the pertinent collections in DAOM have been unavailable as loans for restudy.

Limacinia Neger *in* Johow (1896) emend.
=*Metacapnodium* Spegazzini (1918); Hughes (1972, 1979), pro parte, teleomorph only.
=*Ophiocapnocoma* Batista & Ciferri (1963), pro parte, teleomorph only.

TELEOMORPH: Ascospores at maturity in ascus transseptate, cell walls containing dark brown pigment. Ascus, fissitunicate, ovoid to clavate ventricose. Hymenium basally located in single locule surrounded by pseudoparenchymatous wall interiorly comprised of thin walled hyaline cells which bear downward projecting extensions in the apical regions, the

AUTHOR	ASCOSPORES brown/hyaline	ASCOSPORE SEPTATION	ASCOCARP SETOSE or GLABROUS seta/no seta	NAME USED FOR LIMACINIA FIDE NEGER 1897
NEGER 1896.	. . .X . . ./.	.TRANSVERSE.	. . . . . ./. . . .X .	. .LIMACINIA. . . . .
LINDAU 1897	. . .X . . ./.	.TRANSVERSE.	. . . . . ./. . . .X .	. .LIMACINIA. . . . .
SACCARDO & SYDOW 1899.	. . .X . . ./. . . . .X . .	SUBTRISEPTATE .RARELY MURIFORM	.X . . . ./. . . . .X .	. .LIMACINIA. . . . .
HÖHNEL 1909.	. . .X . . ./.	.TRANSVERSE.	. . . . . ./. . . .X .	. .LIMACINIA. . . . .
ARNAUD 1910	. . .X . . ./. . . . .X . .	.TRANSVERSE.	.X . . . ./. . . . .X .	. .LIMACINIA. . . . .
THEISSEN & SYDOW 1917	. . . ./. . . .XXX.	..MULTICELLULAR . .	. . . . . ./. . . .X .	. .PHRAGMOCAPNIAS. . . . .
SPEGAZZINI 1918	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./. . . .X .	. .METACAPNODIUM . . . . .
MENDOZA 1925	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./. . . .X .	. .PHRAGMOCAPNIAS. . . . .
CLEMENTS & SHEAR 1931	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./. . . .X .	. .PHRAGMOCAPNIAS. . . . .
FRASER 1935	. . . ./. . . . .X . .	.MULTICELLULAR. . .	.X . . . ./.	. .CAPNODIUM. . . . .
FISHER 1939.	. . .X . . ./.	.TRANSVERSE.	. . . . . ./.	. .LIMACINIA. . . . .
MILLER & BONAR 1941. .	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./. . . .X .	. .AITHALOMYCES. . . . . . .
BARR 1955.	. . .X . . ./.	.TRANSVERSE.	.X . . . ./.	. .LIMACINIA. . . . .
YAMAMOTO 1957	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./. . . .X .	. . . .
SAWADA 1959.	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./. . . .X .	. . . .
BATISTA & CIFERRI 1963	. . . ./. . . . .X . .	.TRANSVERSE.	. . . . . ./.	. .PHRAGMOCAPNIAS. . . . .
HUGHES 1966.	. . .X . . ./.	.TRANSVERSE.	.X . . . ./.	. .LIMACINIA. . . . .
LUTTRELL 1973	. . .X . . ./.	.TRANSVERSE.	.X . . . ./.	. .LIMACINIA. . . . .
ARX & MÜLLER 1975 . . .	. . . ./. . . . .X . .	.TRANSVERSE.	.X . . . ./.	. .METACAPNODIUM . . . . .
HUGHES 1979.	. . .X . . ./.	.TRANSVERSE.	.X . . . ./.	. .METACAPNODIUM . . . . .

Figure 4, A historical summary of the concept of *Limacinia* Neger.

periphyses; becoming thick walled exteriorly with the cell walls containing a dark brown pigment and bearing appendages of varying lengths. Ascocarp ostiolate, borne on aerial hyphae.

ANAMORPH: unknown

Type species:

Limacinia fernandeziana Neger in Johow (1896) emend.
=Morfea fernandeziana (Neger) Maire (1911), pro parte, teleomorph only.

Teleomorph: Characters of the genus. Ascospore initial fusiform, hyaline, thin walled; septation at first microcephalic, with bipolar growth, becoming 9-11 transseptate at maturity in the ascus; brown pigmentation deposition in the wall beginning at 3-septate state; 58-73μm in length, and 15 μm median, 12-15 μm distal ends. Ascus 170-195 μm in length, endotunica approximately 30 μm wide, extending up to 195 μm beyond apical opening of exotunica. Hymenium eventually containing fully mature asci. Periphysoids hyaline, branched 2-3 μm x 30-50 μm. Ascocarp appendages up to 75 μm in length, component cells with laterally convex cells and opposing septa flat and parallel giving a moniliform appearance. Ascocarp 365-415 μm in height, 345-365 μm in width, elliptical, with ostiolar region somewhat pronounced; nestled in a dense mat of aerial mycelium which forms on leaves and twigs of support plants.

Neotype: Juan Fernandez Islands, Mas A Tierra, Cerro Alto; Don R. Reynolds; LAM300300; 15 July 1971. Curated in the herbarium of the Natural History Museum of Los Angeles County, Los Angeles, California, USA.

Limacinia belongs to the Capnodiaceae (Saccardo) Hohnel (1910); Luttrell (1973); Arx and Muller (1975).

The emended description of L. fernandeziana differs from the Neger protologue in several ways. The teleomorph cannot be convincingly demonstrated to have an organic connection to any anamorph in the material at hand. The ascocarps were originally described as found in groups of 2-3, sunken in the interior of a dense mycelium. The mature ascocarps in the neotypic material orginate from a dense of aerial mycelium and are nestled in its surface. Neger described the ascocarps as 0.1-0.15mm; I found them to be a maximum of 415 μm in length and a maximum width of 365 μm. Neger found the fruit bodies to be spherical to elliptical and lacking a pore, with dehisence by breaking in an irregular manner near or on the "point." I believe the point of the fruit body is actually the apical region of the ascocarp surrounding the ostiole. The fruit body is somewhat spherical in the lower portion with an ovoid outline because of the "point." As mentioned above, the ascospore description of Neger is believed to have been based on observations of immature asci, thus the measurements of the spores differ.

SPECIMENS EXAMINED

The specimens cited here are those examined for this study. Included are specimens implicated as *Limacinia* in the literature and by virtue of the synonomy imposed in this article. Additional material that I have collected is also cited. Type material is indicated with an asterisk. Specimens are grouped by country localities. Available collection data are given as (1) country or province, (2) other locality data, (3) collection date, (4) collector, (5) herbarium localities of the specimen indicated with the acronyms listed in Index Herbariorum, Edition 7, (6) the original name assigned to a specimen.

AUSTRALIA: Cavey Peak; May 1934; M. Edwards (=Fraser B57); DAR12662, LAM200782 *Capnodium mucronatum*. New South Wales, Barrington Tops; M. Edwards; DAR19739, LAM200776 *Capnodium mucronatum*. New South Wales, Bundanoon; 21 April 1934; L. R. Fraser B75; DAR12740, DAOM110690, LAM200763 *Ophiocapnocoma phlioiphila*. New South Wales, Camboyne; January 1935; L. R. Fraser B108; DAR12725, DAOM110691, LAM200770 *Capnodium moniliforme*. New South Wales, Camboyne; 7 January 1935; L. R. Fraser B95; DAR12756, DAOM110688, LAM200764 *Capnodium mucronatum*. New South Wales, Darrigo; 26 January 1936; L. R. Fraser; DAR12690, DAOM110698, LAM200784 *Capnodium moniliforme*. New South Wales, Hawksbury Road, Wiseman's Ferry; October 1934; L. R. Fraser; DAR33759, WSW, LAM205291 LAM207243 *Limacinia concinna*. New South Wales, Narrabeen; August 1934; L. R. Fraser; DAR33758, BPI, IMI13977, WSW, LAM200894 LAM201504 LAM205289 LAM207259 *Limacinia concinna*. New South Wales, Narrabeen; November 1934; L. R. Fraser B86; DAR12749, LAM205288 LAM207257 *Limacinia concinna*. New South Wales, Pennant Hills; May 1932; L. R. Fraser 335; DAR12588, DAOM110705, LAM200788 *Ophiocapnocoma phlioiphila*. New South Wales, Salisbury; May 1934; L. R. Fraser; *DAR19740, IMI26078, LAM200775, LAM200971 *Capnodium moniliforme* New South Wales, Sussex Inlet; March 1937; L. R. Fraser; DAR12680, DAOM110700, LAM200765 LAM205290 LAM207253 *Limacinia concinna*. New South Wales, Williams River; August 1935; L. R. Fraser; DAR12693, DAOM110695, LAM197681 *Capnodium moniliforme*. New South Wales, Williams River; June 1936; L. R. Fraser; DAR12679, LAM207246 *Capnodium mucronatum*. New South Wales, Wiseman's Ferry; October 1934; L. R. Fraser; IMI13978, LAM200975 LAM201017 *Limacinia concinna*. New South Wales, Wyong; 9 January 1935; L. R. Fraser B101; DAR12717, DAOM110692, LAM200750 *Limacinia concinna*. TAsmania, Hobart, Mt. Wellington; January 1933; D. Martin; DAR19733, IMI26077, LAM200761 LAM205460 *Capnodium moniliforme*. BELGIAN CONGO: Kivu, Ruambira; F. L. Hendrickx 2620; IMI16244 *Limacinia hendrickxii*. BRASIL: Bahia, Salvador, Ondina; E. A. F. da Matta; URM6119 LAM200940 *Limacinia capnodioides*. Ceara, Baturite; 17 May 1959; Ilo Vasconcelos; *URM13705, LAM201554 *Morfea alaskensis* var. *minor*. Pernambuco, Recife, Casa Amarela; 24 January 1948; A. Vital; URM688, LAM201217 *Limacinia aurantii*. Pernambuco, Recife, Dois Irmãos; O. S. da Silva; 18 March 1958; URM12569, LAM 201375 *Morfea tuba*.

Pernambuco, Recife, Dois Irmãos; O. S. da Silva; 16 March 1960; *URM13818, LAM201556 _Morfea miconiae_ var. _major_. Pernambuco, Recife, Vitoria; 5 May 1956; O. S. da Silva; URM2739, LAM200900 _Morfea helianthemi_. São Paulo, São Paulo, Botanical Gardens; April 1900; A. Puttemans; S. ex Herb. Sydow, LAM201514 _Limacinia aurantii_. CANADA, British Columbia, Kaslo; 8 August 1948; W. A. Porter; DAVFP8333, LAM202047 _Limacinia alaskensis_. British Columbia, Kitimat; 14 June 1954; A. C. Molnar; DAVFP9239, LAM202048 _Limacinia alaskensis_. British Columbia, Shuswap Lake; 21 May 1954; B. G. Collins; DAVFP9202, LAM202046 _Limacinia alaskensis_. British Columbia, Victoria Island, Lake Cowichan; 12 June 1948; W. G. Ziller; DAVFP3209, LAM202049 _Limacinia alaskensis_. British Columbia, Victoria Island, Lake Cowichan; 10 September 1943; R. E. Foster; *DAVFP8332, LAM202043 _Limacinia moniliformis_ var. _quinqueseptata_. British Columbia, Victoria Island, Lake Cowichan; 22 September 1943; R. E. Foster; DAVFP2491, LAM202045 _Limacinia alaskensis_. British Columbia, Victoria Island, Forbidden Plateau; 23 June 1954; C. Madhosingh; DAVFP9222, LAM202044 _Limacinia alaskensis_. CHILE, Juan Fernandez Islands, Mas a Tierra, C. J. F. Skottsberg; 22 August 1908; BPI, S, UPS, LAM200492 LAM201036 _Limanicia fernandeziana_ ex Vestergren, Micromycetes rariores selecti 1750. Juan Fernandez Islands, Mas a Tierra, El Yunque, 30 March 1917; Carl Skottsberg and Inga Skottsberg; NY, BPI ex MO, S, LAM200480 LAM200488 _Limacinia scoriadea_ ex Svenska Pacificexpeditionen 1916-1917. Juan Fernandez Islands, Mas A Tierra, Cerro Alto; 14 December 1965; F. G. Meyer 9548; BPI ex NA, LAM200491 _Limacinia fernandeziana_. Juan Fernandez Islands, Mas a Tierra, Portezuela de Villegra; Carl Skottsberg and Inga Skottsberg; UPS ex S, LAM200891 _Limacinia fernandeziana_. Juan Fernandez Island, Mas A Tierra, Cero Alto; 15 July 1971; Don R. Reynolds; *LAM300300 _Limacinia fernandeziana_. COSTA RICA: Cerro de la Muerte; 18 January 1974; D. R. Reynolds; LAM200324 _Limacinia_. San Jose, La Palma; 17 March 1924; P. C. Stanley; URM5245, LAM200904 *_Morfea miconiae_. San JOse, Turrialba; 12 January 1974; D. R. Reynolds; LAM200246 _Limacinia_. ECUADOR: Puyo, Napo-Pastaza; 17 January 1938; H. Sydow 870a; NY, *S, LAM200741 LAM200852 _Limacinia exilis_ ex Herb. H. Sydow ex Fungi Aequatorienses; Quito, Monte Pichincha; 20 January 1938; H. Sydow; NY, *S, L, IMI2022, LAM200980 _Limacinia quitensis_ ex Herb H. Sydow. ETHIOPIA: Kochubi; November 1960; R. B. Stewart; IMI88317, LAM205386 _Capnodium juniperi_. INDIA: Assam, Jorhat; July 1963; A. K. Roy 4; IMI107628, LAM205424. INDONESIA: West Java; 1921; C. Hartley; URM6412 ex J. A. Stevenson ex Herb. James Weir, LAM 200859 _Morfea alaskensis_. PHILIPPINES: Laguna, Los Baños; March 1914; C. F. Baker 2933; URM4814 ex PAV, LAM200943 _Limacinia imperspicua_. Laguna, Mt. Maquiling; 10 January 1914; C. F. Baker; NY, I116162, PAD ex Herb. P. A. Saccardo 2583, URM4823, LAM200606 LAM201052 LAM201480 LAM210570 ex C. F. Baker Fungi Malayana 150 _Limacinia biseptata_. PORTUGAL: Coimbra; October 1902; A. F. Moller; URM4770, LAM201562 _Morfea helianthemi_ var. _major_. SAMOA: 30 June 1905; Rechinger; *FH, ex Herb. F. von Hohnel 2801, _Limacinia spinigera_. SARAWAK: 1962; F. H. 148; IMI96186, LAM20236 _Metacapnodium_. Balingian; 1962; F. H.

149; IMI96187, LAM205432 *Capnodium monoliforme*. Balingian; 27 August 1962; IMI961906, LAM205431 *Capnodium moniliforme*. Baris; 1972; F. H. 493; IMI174350, LM205433 *Metacapnodium*. SCOTLAND: *IMI172719, LAM205327 *Limacinia juniperi*. Aberdeen, north of Bush Lawse; 19 September 1973; D. R. Reynolds; LAM300288 *Limacinia juniperi*. Aberdeen, Strathdon, Polduille Bridge; 19 September 1973; D. R. Reynolds; LAM300287 *Limacinia juniperi*. Aberdeen, near Tornahaish; 17 September 1973; D. R. Reynolds; LAM300275 *Limacinia juniperi*. Aberdeen/Perth, Caenlochan Forest; 20 September 1973; D. R. Reynolds; LAM300289 *Limacinia juniperi*. Banff, Blairnamarrow; 17 September 1973; D. R. Reynolds; LAM300276 *Limacinia juniperi*. Banff, near Dalnashaugh; 17 September 1973; D. R. Reynolds; LAM300277 *Limacinia juniperi*. Banff, Midtown Buchromb; 19 September 1973; D. R. Reynolds; LAM300286 *Limacinia juniperi*. Inverness, Coylam; 14 April 1949; R. W. G. Dennis; K. Inverness, east of Coylumbridge, 18 September 1973; D. R. Reynolds; LAM300279 *Limacinia juniperi*. Inverness, Invadruie; 18 September 1973; D. R. Reynolds; LAM300278 *Limacinia juniperi*. Inverness, road to Loch an Eilan; 18 September 1973; D. R. Reynolds; LAM300280 *Limacinia juniperi*. Inverness, Loch an Eilan; 18 September 1973; D. R. Reynolds; LAM300281 *Limacinia juniperi*. Inverness, Irish House; 18 September 1973; D. R. Reynolds; LAM300282 *Limacinia juniperi*. Inverness, Lynachlaggan; 18 September 1973; D. R. Reynolds; LAM 300283 *Limacinia juniperi*. Inverness, Outer Hebrides, Harris, Flodabay; 24 October 1972; R. W. G. Dennis; K. Narin, Clephanton; 19 September 1973; D. R. Reynolds; LAM300284 *Limacinia juniperi*. Narin, Maviston; 19 September 1973; D. R. Reynolds; LAM300285 *Limacinia juniperi*. Perth, Loch Benachally; 28 June 1967; S. J. Hughes; K ex DAOM116558, LAM200893 *Metacapnodium juniperi*. Perth, Loch Tey; 20 September 1973; D. R. Reynolds; LAM300290 *Limacinia juniperi*. SIERRA LEONE: C. T. Payne M6369; IMI61717, LAM205393 *Limacinia*. TAIWAN: 1 December 1928; K. Sawada; *TNU, LAM201868 *Limacinia fagarae*. 11 March 1931; *TNU, LAM201863 *Limacinia citri*. 14 November 1929; *TNU, LAM210864 *Limacinia citricola*. 24 March 1930; LAM210869 *Limacinia oblongiospora*. Taihoku, Kagi; 26 March 1930; K. Sawada; *TNU, TNS-F220698, LAM201866 LAM201933 *Limacinia elaeocarpi*. Taihoku, Sirin; 11 September 1938; W. Yamamoto 9; TNU, *Limacinia filiformis*. Taihoku, Seisiyo; 15 March 1942; W. Yamamoto 38; *TNU, LAM201788 LAM201789 *Limacinia clavatispora*. Taihoku, Sinten; 16 March 1941; W. Yamamoto 13; *TNU, LAM201793 *Limacinia globosa*. Taihoku, Sinten; 15 February 1942; W. Yamamoto 101; TNU, LAM201794 *Limacinia globosa*. Taihoku, Taihoku; 16 October 1938; W. Yamamoto; TNU, LAM201798 *Limacinia*. Tonzono-cho; 13 September 1929; Chin; *TNS-F220697, LAM201969 *Limacinia chin-kishoi*. TERRITORY OF NEW GUINEA: Markham Valley, Ergs; "6.2.69"; J. H. Schotter; IMI6397, LAM205450. UGANDA: Entebbe Road; February 1931; C. G. Hansford 1456; URM6905 ex ENT1456, LAM200967 *Limacinia*. UNION OF SOUTH AFRICA: Zoutpansberg, Woodbush; 19 April 1923; E. M. Doidge; *PREM17744, IMI35916a&b LAM201012 LAM201013 *Limacinia nuxiae*. USA: Alaska, Glacier Bay; 12 June 1889; W.

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TYPE STUDIES IN THE POLYPORACEAE 17. SPECIES DESCRIBED BY W.A. MURRILL.

by

LEIF RYVARDEN

Botany Div., Dep. of Biology, Univ. of Oslo,
P.O.Box 1045, Blindern, N-0316 Oslo 3, Norway

SUMMARY

Of the 343 polypores described by W. A. Murrill, 62 are accepted, 268 are synonyms, 1 name is invalid, 1 name is superfluous, 8 are of uncertain status because of sterile types, while the type of 3 species were not found. 17 new combinations are proposed and 11 species described in detail. The genus Murrilloporus is described based on Trametes rutilantiformis as type. The genus is characterized by a pileate basidiocarp, clamped generative hyphae, dextrinoid skeletal hyphae and asperulate, ellipsoid and non-dextrinoid spores.

The American mycologist W.A. Murrill was an industrous mycologist and was mostly occupied with polypores, of which he described 343. He travelled widely in the West Indies and Mexico, as well as receiving considerable collections from the Phillipine Islands for determination. He also collected extensively within the United States, although mostly in the Eastern States. After he retired from the New York Botanical Garden he settled in Gainsville, Florida from where he also described many species. Murrill was not an eager user of the microscope and many of his determinations were based on macromorphology, resulting in a rather high number of synonyms. His generic concepts were mostly ignored in his life time, but have, in the last decades, been revived and found wide acceptance.

Those who want to know more about his life should read his privately published autobiography (Murrill 1945). It is probably one of the very few autobiographies from modern times that is written in the third person! After having read it most readers will easily understand why it was published privately. It is a strange and very personal document.

Since he stayed at New York Botanical Garden during most of his career as an active mycologist, almost all his types are deposited there. This information is therefore not repeated for all the following species. A restricted number of types are in the Herbarium of the Agricultural Experimental Station in Gainsville, Florida. In such cases the collection is cited with F and a number. There are scattered isotype of some species, especially the resupinate ones in the herbaria of Kew (K), Stockholm (S), Harvard (FH) and the National Fungus collection (BPI). There has been no time to check this properly and thus,there are no indications of where isotypes are placed.

In the following the species are treated alphabetically in the genus in which they were originally described. To save space, the label is cited in an abbreviated form with indication of country where the collection was made, in some cases more exact localities are cited when this was felt necessary, then the collector, and collecting number. This should be sufficient for an exact identification of the lectotype.

When species has been accepted, it is cited in the appropriate genus with a reference to a recent description or described in detail if no modern description seems to exist.

Since Murrill published most of his species in a restricted number of journals, the names of these have been abbreviated to save space, in the following way:

BTBC - Bulletin of the Torrey Botanical Club.
MYCOL - Mycologia.
NAF - North American Flora.
NYBG - Bulletin of the New York Botanical Garden.

The other journals and books in which he published species, have been cited in the normal way.

ABORTIPORUS Murr.

A. subabortivus BTBC 65:655, 1939. USA, Florida, F. 17955.
= *Diacanthodes novo-guineensis* (Henn.) Fid.
A. tropicalis MYCOL 2:185, 1910. Jamaica, Murrill 836.
= *Abortiporus fractipes* (Berk. & Curt.) Kotl. & Pouzar.

AGARICUS Fr.

A. juniperinus BTBC 32:85. 1905. USA, Kansas, Bartholomew, Nov. 8. 1894.
= *Antrodia juniperina* (Murr.) Niem. & Ryv. For a description, see Niemelä & Ryv. (1975:427).

AMAURODERMA Murr.

A. asperulatum BTBC 35:407, 1908. Philippines, D. Copeland, 2. Feb. 1904.
= *Ganoderma asperulatum* (Murr.) Bres.

Fruitbody stipitate, pileus laterally attached, about 5 cm in diameter and 1,5 cm thick in center, surface glabrous, sulcate, dull and dark brown with a thin crust. Stipe up to 5 cm high, 6-7 mm in diameter with a dark brown dull crust, core of stipe cream and loose of consistency. Pore surface greyish brown, pores 5-6 per mm in the type, up to 6 mm deep. Context cream coloured, 1-2 mm thick and cottony.

Hyphal system dimitic, generative hyphae with clamps, 2-4 µm in diameter, skeletal hyphae dominating, unbranched, sinuous, 2-6 µm in diameter, no binding hyphae observed. Pileus crust undifferentiated and composed of agglutinated, dark brown hyphae which are very difficult to tease apart. Spores truncate, pale yellowish brown, strongly ornamented, 20-25 x 13-18. µm

The species is easy to recognize by its cream-coloured, thin context and the large spores.

A. avellaneum NAF 9:116, 1908. Nicaragua, Smith.
= *Amauroderma sprucei* (Pat.) Torr. as already indicated by Furtado (1981:88).

A. bataanense BTBC 35:407, 1908. Philippines, Curran, Sept. 1907. Forestry Buereau 7528. Accepted in the genus, for a detailed description, see Furtado (1981: 22-24).

A. brittoni MYCOL 2:193, 1910. Jamaica, Britton 3630.
= *Laetiporus persicinus* (Berk. & Curt.) Gilbn.

A. clemensiae BTBC 35:408, 1908. Philippines, Mindanao, Lake Sanrao, M.S. Clemens, Sept. 1907.
= *Microporellus clemensiae* (Murr.) Ryv. comb.nov. Basionym: *Amuroderma clemensiae* Bull. Torr. Bot. Cl. 35:408. 1908. For a description of this species, see Ryvarden & Johansen (1980:301).

A. elmerianum BTBC 34:475, Philippines, Elmer 7210.
= *A. rugosum* (Blume et Nees: Fr.) Torr.

A. flaviporum NAF 9:116, 1908, Jamaica, Earle 105.
= *Ganoderma coffeatum* (Berk.) Furt.

A. ramosi BTBC 35:408, 1908. Philippines, Ramos 1211.
= *A. rugosum* (Blume et Nees:Fr.) Torr.

A. subrenatum NAF 9:117, 1908. Br. Honduras, Peck 1908.
= *A. camerarium* (Berk.) Furt.

CERRENELLA Murr.

C. subcoriacea NAF 9:74, 1908. Nicaragua, Coll. Shimek.
= *Fuscocerrena portoricensis* (Fr.) Ryv.

COLTRICIA S.F. Gray

C. benquetensis BTBC 35:391, 1908. Philippines. Merrill 5003.
= *C. vallata* (Berk.) Teng.

C. memmingeri BTBC 31:347, 1904. USA, N. Carolina, Memminger 1901.
= *C. montagnei* (Fr.) as already stated by Gilbertson (1954).

C. mowryana BTBC 67:28, 1940. USA, Florida, F. 18391.
= *C. cinnamomea* (Fr.) Murr.

CORIOLELLUS Murr.

C. cuneatus NAF 9:28, 1907. Canada, Br. Columbia, Macoun 60.
= *Oxyporus cuneatus* (Murr.) Ryv. For a description see Overholts (1953:353).

CORIOLOPSIS Murr.

C. bataanensis BTBC 35:393, 1908. Philippines, Copeland 143.
= Accepted in the genus.

Basidiocarps annual to biannual (?), pileate, semicircular to dimidiate with strongly contracted base, coriaceous, up to 15 cm wide and long, 1 cm thick at the base. Upper surface cinnamon to dark rusty brown, hirsute to villose in narrow concentric and slightly sulcate zones, becoming glabrous and blackish brown from the base in old specimens, margin thin and wawy, pore surface tobacco brown, pores angular to round 4-5 per mm, tubes pale brown, non-stratified or with a few distinct zones in old specimens up to 5 mm in each zone, context dark brown, dense and tough, 1-3 mm thick, separated from the loose tomentum on the pileus by a thin black zone.

Hyphal system trimitic, generative hyphae with clamps, 2-4 um wide skeletal hyphae dominating, 3-6 um wide, pale yellowish brown in KOH, binding hyphae much branched and with tapering ends, 2-5 µm wide. Cystidia not seen. Spores abundant in the type, broadly ellipsoid, hyaline, thinwalled and non-amyloid, 4,5-5 x 3,5-4 µm.

The species is characterized by the densely zonate, dark brown, tomentose pileus and with a duplex consistency as the context proper and the tomentum is separated by a black zone. Superficially it looks like a dark brown *Trametes hirsuta* with which it shares the duplex consistency. However, the spores of *C. bataanensis* are grossly different from those of *T. hirsuta* (cylindrical to allantoid).

Besides the type, the following collections have been examined: Malaysia: Kelantan, Ketah, 24. Jan. 1927. G. Henderson 19632. Herb. SING, Malaysia: Johore, Grumang Dulai, 16 Nov. 1924. Holtum 16350. Herb. SING.

C. caperatiformis NYBG 8:139, 1912. Mexico, Murrill 1017.
= *Datronia caperata* (Berk.) Ryv. comb. nov. Basionym: *Polyporus caperatus* Berk. Ann. Mag. Nat. Hist. Ser. 1,3:391, 1839.
The dark umber brown context separated from the tomentum by a black zone and cylindrical spores indicate that this species better belongs in *Datronia* Donk than in *Coriolopsis* Murr. The latter is typified by *C. polyzona* (Pers.) Ryv. a much paler species showing relationship with *Trametes hirsuta* (Fr.) Pil. and similar species.

C. copelandii BTBC 35:392, 1908. Philippines, Copeland 714.
= *Loweporus roseo-albus* (Jungh.) Ryv.

C. crocatiformis NYGB 8:139, 1912. Mexico, C. Orcutt, 22. Feb. 1910.
= *Phellinus palmicola* (Berk. & Curt.) Ryv.

Hunt (1953:616) was the first to draw the attention to the fact that the type represented a *Phellinus* sp. although he suggested no specific name.

C. fulvocinerea NAF 9:76, 1908. Cuba, Earle & Murrill 413.
= *Datronia caperata* (Berk.) Ryv.

C. fumosa NYBG 8:139, 1912. Mexico, Murrill 312.
= *Cyclomyces tabacinus* (Mont.) Pat.

C. melleoflava BTBC 35:393, 1908. Philippines, For. Bur. 9238.
= *Flavodon flavus* (Kl.) Ryv.

C. nigrocinerea NAF 9:77, 1908. Cuba, Underwood & Earle 1234.
= *Datronia nigrocinerea* (Murr.) Ryv. comb.nov. Basionym: *Coriolopsis nigrocinerea* Murr., North Am. Fl. 9:77, 1908.

Fruitbody applanate, dimidiate with contracted base, about 6 cm long and 3 cm wide, 2-4 mm thick at the base, coriaceous and tough when dry. Pileus adpressed velutinate to finely tomentose in narrow concentric zones, dark brown, some zones almost glabrous and blackish exposing a thin cortex separating the tomentum from the context proper. Pore surface pale brown in fertile specimens, dark cinnamon in sterile ones, pores round to subangular 3-4 per mm. Tubes up to 3 mm deep, cinnamon to sienna brown. Context dense, dark cinnamon and about 1-1,5 mm thick with numerous hyphal pegs.

Hyphal system trimitic, generative hyphae with clamps, 2-3,5 µm wide, skeletal hyphae yellowish brown, 3-6 µm wide, binding hyphae few, tortuous and solid, 2-5 µm wide. Cystidia not seen. Spores cylindrical thinwalled, hyaline and non-amyloid 9-13 x 3-4,5 µm.

The species is closely related to *D. caperata* in macromorphology, but the spores are longer and wider than found in that species, besides that hyphal pegs are not present in *D. caperata*.

C. sarcitiformis NYBG 8:140, 1912. Mexico, Murrill 555.
= *Phellinus sarcites* (Fr.) Ryv.
C. subcrocata BTBC 35:394. 1908. Philippines, Merrill 3694.
= *Trametes cotonea* (Pat. & Har.) Ryv.
C. subglabrescens NAF 9:77, 1908. Cuba, Underwood & Earle 1329
= *Datronia caperata* (Berk.) Ryv.
C. taylorii NAF 9:76, 1908. Cuba, Taylor 1.
= Accepted in the genus.

Fruitbody applanate, dimidiate, semicircular, about 7 cm long, 4 cm wide and 1 cm thick at the base. Pileus glabrous to hispid or scrupose of agglutinated tufts of hyphae, finely radially folded and slightly zoned, cinnamon, paler towards the base as if the upper layer of hyphae here has been somewhat "washed" out. Pores very small, almost invisible to the naked eye, 7-8 per mm, pore surface cinnamon, tubes concolorous, up to 4 mm deep. Context homogeneous, shiny, cinnamon and paler than the tubes, faintly zonate and towards the pileus surface becoming slightly fibrous, no cuticle.

Hyphal system trimitic, generative hyphae with clamps, 2-3,5 µm wide, skeletal hyphae dominating, yellowish brown in KOH, thickwalled to solid, 4-6 µm wide, binding hyphae in the context, solid, tortuous and yellowish brown, 2-4,5 µm wide. Cystidia not seen. Spores cylindrical, thinwalled, smooth, hyaline and non-amyloid, 6-8,5 x 2,5-3 µm.

The species reminds about *Datronia caperata*, but has shorter spores, no black zone below the tomentum and a much thicker fruitbody than is normal in *D. caperata*.

C. tisdaleana BTBC 65:656, 1938. USA, Florida F. 17975.
= *Navisporus sulcatus* (Lloyd) Ryv.

This is the first report of this species from United States. For a detailed description of this distinctive species with pale brown fruitbodies, dextrinoid skeletal hyphae and boat-shaped spores, see Ryvarden (1983).

CORIOLUS Quél.
C. alabamensis NAF 9:19, 1907. USA, Alabama, Earle & Baker 12.
= *Bjerkandera adusta* (Fr.) Karst. indicated already in 1928 on the sheet by L. Overholts.
C. clemensiae BTBC 35:394, 1908. Philippines, Clemens, Sept.-Oct. 1907.
= *Trametes modesta* (Fr.) Ryv.
C. concavus NYBG 8:140, 1912. Mexico, Murrill 838.
= *Coriolopsis cfr. polyzona* (Pers.) Ryv. The type is sterile and badly developed.
C. concentricus NAF 9:23, 1907. Canada, Ontario, Dearness 700.
= *Trametes zonatella* Ryv.
C. cuneatiformis BTBC 34:467, 1907, Philippines, Williams Dec. 1903.
= *Trametes modesta* (Fr.) Ryv.
C. currani BTBC 35:395, 1908. Philippines, Curran & Merrill 8965.
= *Trametes marianna* (Pers.) Ryv. The type specimen is sterile, but it has the typically slightly dextrinoid reaction of the skeletal hyphae in *T. marianna*.
C. delectans NAF 9:20, 1907. Cuba, Earle & Murrill 431.
= *Trametes membranacea* (Fr.) Kreisel.
C. effusus MYCOL 2:186, 1910. Jamaica, Murrill 261.
= *Junghuhnia undigera* (Berk. & Curt.) Ryv. For a description, see Ryvarden (1984).

C. fulvoumbrinus NAF 9:24, 1907. Cuba, Earle 3.
= *Trametes villosa* (Fr.) Kreisel. The colour of the type is untypical because it has been in contact with reddish clay.

C. hexagoniformis NAF 9:20, 1907. USA, Alabama, Earle, Dec. 15. 1900.
= *Antrodia heteromorpha* (Fr.) Donk.

C. hollickii MYCOL 2:187, 1910. Jamaica, Britton & Hollick 2779.
= *Trametes fulvitincta* (Berk. & Curt.) Ryv.

C. hondurensis NAF 9:22, 1907. British Honduras, H. Peck 1906.
= *Rigidoporus microporus* (Fr.) Overeem.

C. irpiciformis NYBG 8:141, 1912. Mexico, Murrill 876.
= *Steccherinum sp.*? The type is sterile while the cystidia are apically encrusted. A fertile collection is necessary to acertain its identity.

C. lloydii NAF 9:23, 1907. USA, Ohio, C.G. Lloyd.
= *Trametes zonatella* Ryv.

C. ochrotinctellus NAF 9:22, 1907. USA, Mississippi, Earle 55.
= *Tyromyces duracinus* (Pat.) Murr. as already pointed out by Lowe (1975:53).

C. orizabensis NYBG 8:141, 1912. Mexico, Murrill 867.
= *Trametes cervina* (Schw.) Bres.

C. perpusillus BTBC 35:396, 1908. Philippines, Clemens July 1907.
= *Trametes modesta* (Fr.) Ryv.

C. pertenuis MYCOL 2:187, 1910. Jamaica, Murrill 397.
= *Trametes membranacea* (Fr.) Kreisel.

C. rubritinctus BTBC 35:396, 1908. Philippines, Merrill 6117.
= *Trametes modesta* (Fr.) Ryv.

C. scutatus NAF 9:25, 1907, Mexico, Smith 35.
= *Trametes pavonia* (Hook.) Ryv.

C. subabietinus BTBC 65:658, 1939. USA, Florida F 8746.
= *Skeletocutis amorphus* (Fr.) Kotl. & Pouz.

C. subchartaceus NAF 9:24, 1907. USA, Colorado, Baker et al. Coll. 186.
= *Trichaptum subchartaceus* (Murr.) Ryv. For a description, see Overholts (1953:338).

C. subectypus NAF 9:22, 1907. USA, Florida H. Rau. April 1885.
= *Antrodiella fulvitinctus* (Berk. & Curt.) Ryv.

C. sublilacinus NAF 9:25, 1907. USA, Florida, Lloyd 2077.
= *Skeletocutis amorphus* (Fr.) Kotl. & Pouz.

C. sublimitatus BTBC 65:658, 1939. USA, Florida, F. 8741.
= *Trichaptum biformis* (Fr. in Kl.) Ryv.

C. subpavonius NYBG 8:142, 1912. Mexico, Murrill 223.
= *Antrodiella liebemannii* (Fr.) Ryv.

C. substipitatus NAF 9:22, 1907. Jamaica, Earle 629.
= *Trametes modesta* (Fr.) Ryv.

C. subvernicipes BTBC 35:397, 1908. Philippines, Ramos 2144.
= *Microporus vernicipes* (Berk.) Kunt.

C. tenuispinifer BTBC 65:658. 1939. USA, Florida, F. 8755.

The type has not been found. Overholts (1953:428) states to have seen it, and reports it to be a sterile *Coriolus* infected with an imperfect fungus with dark brown spines, which obviously inspired Murrill to the specific epithet. The name should be dropped from consideration.

C. tepeitensis NBYG 8:142, 1912. Mexico, Tepeite Valley, Murrill 550.
= *Perenniporia tepeitensis* (Murr.) Ryv. comb.nov. Basionym: *Coriolus tepeitensis* Murr. Bull. New York. Bot. Gard. 8:142,

1912.

Fruitbody pileate, effused reflexed and small, up to 5 mm wide and 10 mm long, 1-3 mm thick, effused decurrent part about 10 mm wide, coriaceous. Pileus azonate, smooth and glabrous, cream. Pore surface cream, pores round, 4-5 per mm, tubes cream, up to 2 mm deep. Context cream 1 mm thick. Hyphal system dimitic, generative hyphae thinwalled and with clamps at the septa, 1,5-3 µm wide. Skeletal hyphae narrow, 1,5-2,5 µm wide, unbranched and to sparingly branched and dextrinoid, spores globose to subglobose and slightly thickwalled and dextrinoid, 5,5-7 x 5-6,5 µm.

Besides the type, specimens have been examined from Costa Rica, Cartago prov. Cartago, 28 June 1963. J. Lowe 12920 (NY) and USA Tenn. Gatlinburg, Cherokee orchard, 26. Aug. 1950. J. Lowe 4531 (NY) and North Carolina, Ashville, Burnt Creek Exp. Forest. 16. Sept. 1959, on Robinina J. Lowe 11319 (NY).

The species is rather characteristic with its small reflexed fruitbodies and dextrinoid skeletal hyphae and subglobose spores. The latter separates it from P. medulla-panis which has truncate spores and never has been found in a pileate condition.

C. washingtonensis MYCOL 4:92, 1912. USA, Washington, Murrill 101.
 = Oxyporus cuneatus (Murr.) Ryv.

C. xuchilensis NYBG 8:143, 1912. Mexico, Murrill 1171.
 = Tyromyces xuchilensis (Murr.) Ryv. comb.nov. Basionym: Coriolus xuchilensis New York Botanical Gard Bull. 8:.143, 1912.

Fruitbody single or imbricate, up to 100 mm long, 3-6 mm wide and up to 0,5 mm thick, partly reflexed with a decurrent pore surface. Pileus white, silky to velutinate and azonate. Pore surface white to cream, pores angular 3-5 per mm, tubes up to 0.5 mm deep. Context very thin, white and soft. Hyphal system monomitic, generative hyphae with clamps, 2-5 µm wide. Cystidia none. Spores ellipsoid-subglobose, hyaline, thinwalled and non-amyloid. 3,5-4,5 x 2,5-3 µm.

CYCLOPORELLUS Murr.

C. barbatus BTBC 35:397, 1908. Philippines, Curran & Merritt 8208.
 = Cyclomyces tabacinus (Mont.) Pat.

DAEDALEA Fr.

D. favoloides NYBG 8:151, 1912. Mexico, Murrill 48.
 = Daedaleopsis confragosa (Fr.) Schroet. The type represents a small-pored variety, i.e. with 3-4 pores per mm, otherwise it is typical.

D. isabellina BTBC 35:414, 1908. Philippines, Elmer 6186.
 = Lenzites acuta Berk.

Daedalea kusanoi MYCOL 1:169, 1909. Japan, Tokyo, Botanical Garden 1901. Kusano.
 = Lenzites acuta Berk.

D. subconfragosa BTBC 34:415, 1908. Philippines, Foxworthy 22.
 = Lenzites acuta Berk.

D. westii BTBC 65:649, 1939. USA, Florida, F. 9190.
 = Antrodia juniperina (Murr.) Niem. & Ryv.

EARLIELLA Murr.

E. cubensis BTBC 32:479, 1905. Cuba, Earle & Murrill 193.
 = Trametes scabrosa (Pers.) Cunn. as already stated by Murrill himself (1907:45).

ELFVINGIA Karst.
E. brownii, Western Polyp. p. 29, 1915. USA, California, Brown 307.
= Ganoderma australe (Fr.) Pat. Also stated by Steyaert (1975:461).
E. elmeri BTBC 34:476, 1907. Philippines, Elmer 6961.
= Phellinus pachyphloeus (Pat.) Fidalg.

FAVOLUS Fr.
F. resinosus BTBC 35:398, 1908. Philippines, Ramos 1214.
= Daedalea sulcata (Berk.) Ryv. as stated already by Bresadola (1913:72).
F. subrigidus BTBC 35:398, 1908. Philippines, Curran 9593.
= Identity unknown.
F. tenuiformis NYBG 8:143, 1912. Mexico, Murrill 653.
= Hexagonia tenuis (Hook.) Fr.

FOMES (Fr.) Fr.
F. luzonensis BTBC 34:476, 1907. Philippines, Williams 141.
= Fomitopsis rhodophaea (Lév.) Imaz.
F. philippinensis BTBC 34:477, 1907. Philippines, Williams 1904.
= Fomitopsis dochmia (Berk.) Ryv.
F. rubritinctus BTBC 30:232, 1903. Nicaragua, Smith. Centr. Am. Fungi no 138.
= Fomitella supina (Fr.) Murr.
F. stipitatus BTBC 30:229, 1903. Nicaragua, Smith & Shimek, 1891-92.
= The type has not been found.
F. subferreus NAF 9:97, 1908. Cuba, Earle & Murrill 148.
= Fomitopsis dochmia (Berk.) Ryv. This is noted already by Lowe (1957:69).
F. subresinosus BTBC 35:410, 1908. Philippines, Foxworthy 1628.
= Ganoderma subresinosum (Murr.) Humphr. For a detailed description, see Steyaert (1972:113).
F. subungulatus BTBC 34:410, 1908. Philippines, Merrill 5005.
= Fomitopsis pinicola (Fr.) Karst. as already indicated by R. Imazeki on the sheet.

FOMITIPORELLA Murr.
F. altocedronensis NAF 9:12, 1907. Cuba, Earle & Murrill 541.
= Phellinus altocedronensis (Murr.) Ryv. comb.nov. Basionym: Fomitiporella altocedronensis Murr. North Am. Fl. 9.12, 1907.

Basidiocarp resupinate, perennial, hard and adnate, pore surface rusty brown, pores 7-8 per mm, invisible to the naked eye, tubes rusty to woody brown, stratified, 1-2 mm in long in each layer, context very thin, rusty brown. Hyphal system dimitic, generative hyphae thinwalled, hyaline and 2-4 um wide, skeletal hyphae dominating, golden to rusty brown, thickwalled, straight, 3-6 um wide. Hymenial setae present, thickwalled, acute, dark brown, 30-50 x 7-10 um, spores ellipsoid, hyaline, thinwalled and non-dextrinoid, 4-4,5 x 3-4 um.

Lowe (1966:150) has with a question mark put F. altocedronensis as a synonym of F. cinchonensis Murr. However, the latter has cylindrical spores as shown on fig. 136 (Lowe op cit.) while those of F. altocedronensis are ellipsoid. The latter is reminiscent of a resupinate condition of Phellinus gilvus (Fr.) Pat. but this species has slightly more oblong spores, a more fragile basidiocarp and slender setae.

F. jamaicensis NAF 9:11, 1907, Jamaica, Earle 215.
= Phellinus punctatus (Fr.) Pil.
F. betulina NAF 9:12, 1907. USA, Maine, Murrill 2511.
= Phellinus laevigatus (Fr.) Bourd. & Galz.
F. demetrionis 9:12, 1907. USA, Missouri, Demetrio 19.
= Phellinus gilvus (Schw.) Fr. resupinate condition.
F. floridana NAF 9:14, 1907. USA, Florida, Calkins 850.
= Phellinus umbrinellus (Bres.) Ryv.
F. langloisiana NAF 9:13, 1907. USA, Louisiana, Langlois 2430.
= Phellinus melleoporus (Murr.) Ryv. Lowe (1966:144) has indicated F. langloisiana to be a synonym of Phellinus umbrinellus (Bres.) Ryv., but this species has dark coloured spores while they in the type of F. langloisiana are hyaline to very pale golden yellow.
F. melleopora NAF 9:13, 1907. USA, Louisiana, Langlois 213.
= Phellinus melleoporus (Murr.) Ryv. comb.nov. Basionym: Fomitiporella melleopora Murr. North Am. Flora 9:13, 1907. There is a good description in Lowe (1966:145).

FOMITIPORIA Murr.
F. cinchonensis NAF 9:10, 1907. Jamaica, Earle 411.
= Phellinus cinchonensis (Murr.) Ryv.
F. cubensis NAF 9:8, 1907. Cuba, Earle & Murrill 627.
= Perenniporia tephropora (Mont.) Ryv.
F. dryophila NAF 9:8, 1907. USA, Mississippi, Earle, Sept. 3, 1904.
= Phellinus punctatus (Fr.) Pil.
F. earleae NAF 9:9, 1907. USA, Mississippi, Earle 65.
= Phellinus punctatus (Fr.) Pil.
F. flavomarginata NAF 9:11, 1907. Cuba, Earle & Murrill 559.
= Phellinus ferrugineo-velutinus (Henn.) Ryv. See Ryvarden & Johansen (1980:163) for comments as the type of Hennings species is sterile.
F. jamaicensis NAF 9:11, 1907. Jamaica, Earle 215.
= Phellinus punctatus (Fr.) Pil.
F. laminata NAF 9:11, 1907. USA, Maine, Murrill 1923.
= Phellinus punctatus (Fr.) Pil.
F. langloisii NAF 9:9, 1907. USA, Louisiana, Langlois 2525.
= Phellinus punctatus (Fr.) Pil.
F. lloydii NAF 9:10, 1907. USA, Ohio, Lloyd 2801.
= Phellinus punctatus (Fr.) Pil.
F. maxoni NAF 9:11, 1907. Costa Rica, Maxon 587.
= Phellinus punctatus (Fr.) Pil. Reid (1981:867) has transferred the species to Phellinus and stated it to be different from P. punctatus based on macroscopical features.
F. obliquiformis NAF 9:9, 1907. USA, Ohio, Morgan 30.
= Phellinus punctatus (Fr.) Pil.
F. ohiensis NAF 9:11, 1907. USA, Ohio, Lloyd 3130.
= Donkiporia megaloporia (Fr.) Dom. as indicated by Lowe (1966:168).
F. pereffusa NAF 9:10, 1907. USA, Pennsylvania, Murrill 1130.
= Phellinus laevigata (Fr.) Bourd. & Galz.
F. prunicola NAF 9:9, 1907. USA, Maine, Murrill 1922.
= Phellinus prunicola (Murr.) Gilbn. For a description, see Gilbertson (1979:73).
F. punctatiformis BTBC 65:659, 1939. USA, Florida, F. 12073.
= Phellinus punctatiformis (Murr.) Ryv. For a detailed

description, see Lowe (1966:151). The species is characterised by its navicular spores.

F. tsugina NAF 9:9, 1907. USA, New Hampshire, Wilson, 1905.
= Phellinus punctatus (Fr.) Bourd. & Galz. as already stated by Lowe (1966:163).

F. undulata NAF 9:10, 1907. British Honduras, Peck. Oct. 1906.
= Phellinus undulatus (Murr.) Ryv. For a description, see Lowe (1966: 155). The species is characterized by its hooked setae.

F. weirii MYCOL 6:93, 1914. USA, Idaho, Weir, 1912.
= Phellinus weirii (Murr.) Gilbn. For a description, see Gilbertson (1979:87).

FULVIFOMES Murr.

F. swieteniae. Tropical polyp. p. 87, 1915. Cuba, Earle & Murrill 545.
= Phellinus swieteniae (Murr.) Bond. & Herr. For a description see Lowe (1957:19-20). The species is a member of the confusing Phellinus rimosus (Berk.) Pil.complex with many closely related species.

FUNALIA Pat.

F. philippinensis BTBC 34:469, 1907. Philippines, Williams, Feb. 1904.
= Gloeophyllum imponens (Ces.) Imaz.

FUSCOPORELLA Murr.

F. castletonensis MYCOL 2:184, 1910. Jamaica, Murrill 58.
= Phellinus rufi-tinctus (Berk. & Curt. ex Cooke) Pat.

F. coruscans NAF 9:7, 1907. Cuba. Murrill 473.
= Phellinus umbrinellus (Bres.) Ryv.

F. costaricensis NAF 9:7, 1907. Costa Rica, Maxon 588.
= Phellinus punctatus (Fr.) Pil.

F. ludovicianus NAF 9:6, 1907. USA, Louisiana, Langlois 1737.
= Phellinus laevigatus (Fr.) Bourd. & Galz.

F. mexicana MAF 9:7, 1907. Mexico, Smith 1891.
= Phellinus umbrinellus (Bres.) Ryv.

F. shaferi NAF 9:7, 1907. Montserrat, Shafer 1907.
= Phellinus shaferi (Murr.) Ryv. For a description, see Ryvarden & Johansen (1980:219) or Lowe (1966:142).

FUSCOPORIA Murr.

F. juniperina NAF 9:4, 1907. USA, Louisiana, Langlois 1584.
= Phellinus punctatus (Fr.) Pil.

F. nicaraguensis NAF 9:6, 1907. Nicaragua, Smith 1891.
= Phellinus rufi-tinctus (Berk. & Curt.) Ryv.

GANODERMA Karst.

This is the most difficult genus among the polypores. Only in the G. lucidum complex, i.e. species with a laccate pileus and stipe, there have been described over 240 species. Chaos is an understatement for the present taxonomic status of the genus. In the following section, no attempt has been made to properly evaluate the status of the species in the G. lucidum complex. Large comparative investigations are necessary to establish whether a character like the size and shape of the clavate cells in the cuticle are adaptable to environmental conditions. Steyaerts famous paper (1975) where he

Page 180 line 47 *for* (Jungh.) Ryv. *read* (Kl.) Teng

was able to demonstrate that even the spores in the G. tornatum complex changed by latitude and altitude (based on over 300 specimens) should be a proper warning.

G. areolatum NYBG 8:149, 1912. Mexico, Murrill 588.
= G. resinaceum Boud.

G. argillaceum NAF 9:122, 1908. Cuba, Earle 658.
= G. resinaceum Boud. Teste Steyaert (1980:176).

G. balabacense BTBC 35:410, 1908. Philippines, Mangubat 539.
= G. chalceum (Cooke) Stey.

G. curranii BTBC 35:411, 1908. Philippines, Curran 7544.
= G. lucidum s. lato. The type is sterile.

G. nevadense NAF 9:119, 1908. USA, Nevada, Baker 1489.
= G. oregonense Murr. as stated by Steyaert (1980:156).

G. nitidum NAF 9:123, 1908. Honduras, Wilson 607.
= G. lucidum s. lato.

G. oregonense NAF 9:119, 1908. Unknown collector.
= Accepted species in the genus, for a description, see Steyaert (1980:156).

G. parvulum BTBC 29:605. 1902. Nicaragua, Smith 1891.
= G. lucidum s. lato.

G. perzonatum NAF 9:121, 1908. Cuba, Earle 309.
= G. parvulum Murr. acc. to note from Steyaert in herb NY.

G. praelongum NAF 9:121, 1908. Cuba, Earle & Murrill 536.
= G. resinaceum Boud. teste Steyaert (1980:176).

G. pulverulentum NAF 9:121, 1908. Grenada, Broadway.
G. resinaceum Boud.

G. sequoiae NAF 9:119, 1908. USA, California, Eastwood 40.
= G. oregonense Murr as stated by Steyaert (1980:156).

G. sessile BTBC 29:604, 1902. USA, New York, Bedford Park. 1. Jan. 1902. Collector unknown. Selected as neotype. Originally no type was mentioned.
= G. resinaceum Boud. as stated by Steyaert (1980:174).

G. sessiliforme NYBG 8:149, 1912. Mexico, Murrill 392.
= G. lucidum s. lato.

G. subfornicatum NAF 9:121, 1908. Br. Honduras, Peck 1906.
= G. lucidum s. lato.

G. subincrustatum NAF 9:122, 1908. Jamaica, Earle 176.
= G. lucidum s. lato.

G. subtornatum BTBC 34:477, 1907. Philippines, Williams 1903.
= G. lucidum s. lato.

G. subtuberculosum Lloydia 7:326, 1944. USA, Florida, Palm Beach, F. 18722. Coll. H. Plank.
= G. resinaceum Boud.

G. sulcatum BTBC 29:607. 1902. USA, Florida, Jan. 1897. comm. C.G. Lloyd.
= G. lucidum s. lato.

G. tsugae BTBC 29:601. 1902. Coll. 69, NY. 1929, on hemlock.
= G. lucidum s. lato. Steyaert (1980:148) accepts it as a "good" species.

G. tuberculosum NAF 9:123, 1908. Br. Honduras, Peck 1906.
= Ganoderma oerstedtii (Fr.) Torr., teste Steyaert (1980:159).

G. williamsianum BTBC 34:478, 1907. Philippines, Williams 152.
= Accepted in the genus, for a description see Steyaert (1972:74).

G. zonatum BTBC 29:606, 1902. USA, Florida, Underwood.
= G. lucidum s. lato.

SEE ERRATA

GLOEOPHYLLUM Karst.

G. abietinellum NAF 9:129, 1908. USA, Rocky Mountains, Macoun 524.
= Gloeophyllum abietinum (Fr.) Karst.
G. edule BTBC 34:480, 1907. Philippines, Williams 139.
= Gloeophyllum subferrugineum (Berk.) Bond. & Sing.
G. nigrozonatum BTBC 34:415, 1808. Philippines, Elmer 5941.
Accepted in the genus.

Basidiocarp pileate, sessile, applanate and of even thickness, woody hard, about 6 cm wide, 8 cm long and 2 cm thick. Upper surface glabrous, smooth and zonate, at the base white, at the margin pale brown to ochraceous, concentrically zoned; 3-5 mm wide grey to black and slightly fibrillose, margin thick and obtuse. Pore surface dark brown, pores angular, 1-2 per mm, at the base elongated and some spores deeply split to a semi-lamellate structure, tubes dark brown, up to 15 mm deep. Context dense and dark brown, at the base up to 1 cm thick.

Hyphal system dimitic, generative hyphae with clamps, hyaline and 2-4 um wide, skeletal hyphae totally dominating, dark to pale brown, 3-5,5 um wide. Cystidia and basidia not seen. Spores hyaline, thinwalled, cylindrical, non-amyloid, 10-12 x 4-4,5 um.

In morphology and the white colour of the pileus the species may remind of Hexagonia niam-niamensis Henn. from Africa, which however has regular pores, binding hyphae and larger spores (11-14 x 5-6 um, from sporeprint).

It may be discussed whether this species really belongs in Gloeophyllum as it lacks cystidia so common in many Gloeophyllum species. However, it is now commonly accepted that the genus may also include non-cystidiate species like G. odoratum (Fr.) Imaz. The spores of G. nigrozonatum are within the normal range both with regard to size and shape for Gloeophyllum and the irregular hymenophore indicate that it better belongs in this genus than in Hexagonia where all species has regular hexagonal pores.

G. trabeiforme NYBG 8:152, 1912. Mexico, Murrill 1177.
= Lenzites stereoides (Fr.) Ryv.

GRIFOLA S.F. Gray

G. cristatiformis Lloydia 6:227, 1943. USA, Florida, Newmans lake, Wilson, F. 21494.
= Albatrellus cristatus (Pers.Fr.) Kotl. & Pouz.
G. lentifrondosa NYBG 8:144, 1912. Mexico, Murrill 56.
= Meripilus giganteus (Fr.) Karst.
G. sumstinei BTBC 31:335, 1904. USA, Pennsylvania, Sumstine 11.
= Meripilus giganteus (Fr.) Karst.

HAPALOPILUS Karst.

H. ramosii BTBC 35:400, 1908. Philippines, Ramos 1198.
= Phellinus gilvus (Schw.) Pat.
H. subrubidus BTBC 34:470, 1907. Philippines, Elmer 6912.
= Coriolopsis sanguinaria (Jungh.) Ryv. without a reddish cuticle.
H. subrutilans BTBC 65:655, 1939. USA, Florida, F. 8750.
= Wrightoporia subrutilans (Murr.) Ryv. for a description, see Ryvarden (1982:147).

HEXAGONIA Fr.

H. daedaleiformis NYBG 8:145, 1912. Mexico, Smith 6440.
= *Favolus brasiliensis* (Fr.) Fr.
H. floridana BTBC 31:330, 1904. USA, Florida, Small & Wilson 1904.
= *Favolus brasiliensis* (Fr.) Fr.
H. fragilis BTBC 31:329, 1904. Jamaica, Earle 585.
= *Favolus brasiliensis* (Fr.) Fr.
H. hondurensis BTBC 31:331, 1904. Honduras, Wilson 640.
= *Polyporus arcularius* Fr.
H. luzonensis BTBC 35:401, 1908. Philippines, Curran 7541.
= *Favolus spatulatus* (Jungh.) Lév.
H. maxonii NAF 9:49, 1907. Guatemala, Maxon & Hay 3207.
= *Favolus brasiliensis* (Fr.) Fr.
H. micropora BTBC 31:328, 1904. USA, Maine, White, Aug. 4. 1901.
= *Polyporus mori* Fr. as already indicated by Overholts (1953:157 as *F. alveolaris* (DC:Fr.) Quél.).
H. motzorogensis NYBG 8:145, 1912. Mexico, Murrill 983.
= *Favolus brasiliensis* (Fr.) Fr.
H. pertenuis BTBC 35:401, 1908. Philippines, Curran & Merrill 8948.
= *Favolus* cfr. *brasiliensis* (Fr.) Fr. a badly developed and very contaminated specimen.
H. portoricensis BTBC 31:331, 1904. Puerto Rico, Earle 145.
= *Polyporus arcularius* Fr.
H. pseudoprinceps NAF 9:49, 1907. Puerto Rico, Earle 172.
= *Polyporus virgatus* Berk. & Curt.
H. reniformis NAF 9:50, 1907. USA, Florida, Small & Wilson 2067.
= *Favolus brasiliensis* (Fr.) Fr.
H. subcaperata NAF 9:50, 1907. Jamaica, Earle 622.
= *Favolus brasiliensis* (Fr.) Fr.
H. subpurpurascens NAF 9:51, 1907. Jamaica, Earle 557.
= *Polyporus subpurpurascens* (Murr.) Ryv. comb.nov.
Basionym: *Hexagonia subpurpurascens* Murr. North Am. Fl. 9:51, 1907.

Basidiocarp centrally stipitate, and depressed like a vortex towards the excentric stipe, annual, fragile when dry, Pileus circular and infundibuliform up to 1,5 cm in diameter and 1-2 mm thick. Upper surface purplish to bay, dull, finely areolate and glabrous to slightly pruinose at the margin. Margin strongly deflexed in the type, probably flat in fresh condition. Pore surface white to ochraceous, pores decurrent, angular, 1-1.5 mm in diameter slightly elongated towards the stipe, tubes about 1 mm deep, context very thin and white. Stipe up to 2 cm long, excentric, white to ochraceous, glabrous and smooth, 1-1,5 mm in diameter.

Hyphal system dimitic, generative hyphae with clamps, hyaline and 3-5 µm wide, binding hyphae moderately branched, thickwalled and hyaline, 3-6 µm wide. Basidia clavate, 20-25 x 6-7 µm with 4 sterigmata, spores cylindrical, smooth, thinwalled and non-amyloid, 9-10 x 3,5-4 µm. On dead wood. Known only from the type.

It should be rather easy to recognize this species because of the glabrous purplish pileus and the whitish pore surface with angular pores. It belongs in *Polyporus* s. str. because of the dimitic hyphal system with binding hyphae. *Hexagonia* is a genus for dark brown sessile polypores and larger spores although the interpretation of the genus has varied. With the changes in Botanical Code in Sydney it may even be that the genus will be a synonym of *Polyporus* s. str.

H. sulphurea NYBG 8:145, 1912. Mexico, Murrill 1009.
= *Favolus brasiliensis* (Fr.) Fr.

H. taxodii BTBC 31:332, 1902. USA, Florida, Small & Wilson. May 1904.
= *Pseudofavolus cucullatus* (Mont.) Pat.

H. tessulata BTBC 31:330, 1904. Cuba, Underwood & Earle 1212.
= *Favolus brasiliensis* (Fr.) Fr.

H. wilsonii BTBC 31:329, 1905. Puerto Rico, Wilson 317.
= *Favolus brasiliensis* (Fr.) Fr.

INONOTUS Karst.

I. amplectans BTBC 31:600, 1904. USA, Georgia, Harper 990a.
= *Phylloporia fruticans* (Berk.) Ryv. as already indicated in Overholts (1953:411).

I. clemensiae BTBC 35:401, 1908. Philippines, Clemens Sept.-Oct. 1907.
= Accepted in the genus. For a description, see Pegler (1964:188).

I. corrosus BTBC 31:598, 1904. Jamaica, Earle 203.
= *Phylloporia chrysita* (Berk. & Curt.) Ryv.

I. elmerianus BTBC 34:471, 1907. Philippines, Elmer 6942.
= *Phylloporia chrysita* (Berk.) Ryv.

I. fulvomelleus NAF 9:87, 1908. Jamaica, Underwood 1522.
= Accepted in the genus, for a description, see Pegler (1964:185).

I. jamaicensis BTBC 31:597, 1904. Jamaica, Underwood 23. April 1903.
= Accepted in the genus, for a description, see Pegler (1964:190).

I. juniperinus NAF 9:88, 1908. Texas, Long. 746.
= Accepted in the genus, for a description, see Pegler (1964:190).

I. leei, Western Polypores. p.21, 1915. USA, California, Lee, April 1914.
= *Inonotus andersonii* (Ell. & Everh.) Cerny.

I pertenuis NAF 9:87, 1908. Cuba, Underwood & Eearle 1071.
= Accepted in the genus, for a description, see Pegler (1964:186).

I. porrectus Tropical polypores p. 68. 1915. Bahamas, Wilson, 7748.
= Accepted in the genus, for a description, see Pegler (1964:189).

I. pusillus BTBC 31:599, 1904. Mexico, Palmer 1520.
= Accepted in the genus, for a description, see Pegler (1964:189).

I. texanus BTBC 31:597, 1904. USA, Texas, Underwood, Nov. 24. 1891.
= Accepted in the genus, for a description, see Pegler (1964:188).

I. wilsonii BTBC 31:598, 1904. Honduras, Wilson 438.
= *Phylloporia chrysita* (Berk. & Curt.) Ryv.

LENZITES Fr.

L. betuliniformis NAF 9:128, 1908. Mexico, Smith 24.
= *Lenzites betulina* (Fr.) Fr.

L. clemensiae BTBC 35:416, 1908. Philippines, Clemens, Sept. 1907.
= *Lenzites acuta* Berk.

L. earlei NAF 9:128, 1908. Jamaica, Earle 529.
= *Trametes elegans* Fr.

L. subbetulina NYBG 8:153, 1912. Mexico, Rio Blanco, Rincon Grande. Murrill 878.
= *Lenzites betulina* (Fr.) Fr.

L. submurina BTBC 35:416, 1908. Philippines, Clemens, Sept.-Oct. 1907.
= *Lenzites acuta* Berk.

MICROPORELLUS Murr.

M. subdealbatus BTBC 34:471, 1907. Philippines, Merrill 3511.
= *Microporus vernicipes* (Berk.) Kunt.

PHYLLOPORIA Murr.

P. parasitica Torreya 4:141, 1904. Colombia, Baker, Nov. 16. 1898.
= Accepted in the genus. For a description, see Ryvarden & Johansen (1980:234).

POLYPORUS Fr.

P. arnoldae BTBC 65:653, 1939. USA, Florida, F. 17863.
= *Polyporus fagicola* Murr. The type is sterile.

P. arculariformis Torreya 4:151, 1904. USA, Tennessee, Unaka springs. Aug. 1904. Murrill.
= *Polyporus arcularius* Fr. as already indicated by Overholts (1953:271).

P. coracinus BTBC 34:471, 1907. Philippines, Elmer 7232.
= *Echinochaete russiceps* (Berk. & Br.) Ryv.

P. cowellii BTBC 31:39, 1904. St. Kitts Isl. Britton & Cowell Sept. 1901.
= *P. tricholoma* Mont.

P. gratzianus Fla. Acad. Sci. Qt. J. 8:197, 1945. USA, Florida, F. 32996.
= The type has not been found.

P. maculosus BTBC 31:41, 1904. Central America, C.L. Smith.
= Of unknown identity. The type is a very young and sterile specimen with a lateral stipe, about 2 cm high, pileus 2,5 cm wide , glabrous and pale brown. Pore surface white, pores small 5-6 per mm, tubes and context white. Hyphal system trimitic with clamped generative hyphae and hyaline binding and skeletal hyphae. No hymenium developed. The species should of course never have been described. It may represent a very young *Ganoderma* sp.

P. marbleae Tropical polypores p. 48. 1915. Puerto Rico, Britton & Marble no 1216.
= *Polyporus udus* Jungh.

P. mcmurphyii Western polypores p.12. 1915. USA, California, McMurphy 166.
= *P. squamosus* Fr.

P. palensis BTBC 34:472, 1907. Philippines, Elmer 7236.
= *Favolus spathulatus* (Jungh.) Lév.

P. praeguttulatus MYCOL 2:190, 1910. Jamaica, Murrill & Harris 1105.
= *Tyromyces praeguttulatus* (Murr.) Ryv. comb.nov. Basionym: *Polyporus praeguttulatus* Murr. Mycologia 2:190, 1910.

Basidiocarp annual, fanshaped and dimidiate, about 4 cm wide and long, 6 mm thick at the base with a thin margin, brittle when dry. Upper surface pale reddish brown, azonate, glabrous, slightly fibrillose at the margin, otherwise the upper hyphae have agglutinated to a very thin cuticle, pore surface white to pale cream, pores round, 5-6 per mm, tubes and context concolorous, the latter 3 mm thick. Hyphal system monomitic, generative hyphae with clamps, thinwalled 1,5-4 um wide. Those of the subhymenium and context up to 6 um, agglutinated, gelatinized and thickwalled. Cystidia none, spores cylindrical, thin-walled and non-amyloid, 4-4,5 x 1,5-2 um. Only known from the type. The species reminds slightly about T. floriformis (Quél.) Bond. & Sing., which however has a whitish pileus and wider spores.

P. rhoadsii BTBC 65:653, 1939. USA, Florida, Gainsville, Murrill, F 8938.
= Polyporus cfr. varius Fr. The type is old and sterile.

P. subelegans NAF 9:62, 1907. Jamaica, Earle 542.
= Polyporus leprieuri Mont.

P. underwoodii Murr. in Peck. N.Y. State Mus. Bull. 105:27, 1906. USA, Connecticut, Underwood 768.
= Polyporus admirabilis Peck. as already indicated by Overholts (1953:249).

P. variiporus BTBC 31:37, 1904. Puerto Rico, Earle.
= P. tricholoma Mont. The type is an old and weathered specimen. The pores are far smaller than stated by Murrill in his description, only 6-7 per mm, as in P. tricholoma. The spores of P. variiporus are also in accordance with those of P. tricholoma.

P. westii BTBC 65:651, 1939. USA, Florida, F. 18100.
= Polyporus squamosus Fr., a young specimen.

P. wrightii NAF 9:61, 1907. Cuba, Wright 201.
= Polyporus guinensis Mont.

P. zelleri, Western Polypores p. 13, 1915. Washington state, USA, Zeller 146.
= Osteina obducta (Berk.) Donk.

PORIA Adans.

P. adpressa MYCOL 12:85, 1920. Cuba, Britton, Earle & Wilson 6033.
= Identity unknown.

Morphologically the type specimen reminds of a Schizopora sp. but there is a very strong dominance of thin skeletal hyphae mostly 1-2 um wide. Only fragments of generative hyphae were seen, and they did not remind of those of Schizopora. No basidia and spores were seen. The named should be dropped from consideration.

P. alachuana BTBC 65:659, 1939. USA, Florida, F. 16157.
= Ceriporia alachuana (Murr.) Hallenb. For a description, see Lowe (1966:38).

P. albirosea MYCOL 13:85, 1921. USA, Pennsylvania, Sumstine 70.
= Rigidoporus vitreus (Pers.:Fr.) Donk.

P. amesii MYCOL 12:90, 1920. USA, New York, Ames 340.
= Tyromyces rennyii (Berk. & Br.) Ryv. The spores are slightly smaller than observed in European specimens.

P. arachnoidea MYCOL 12:307, 1920. USA, Louisiana, Langlois 2556.
= Trechispora regularis (Murr.) Lib. as already indicated by Lowe (1966:58)

P. bracei MYCOL 13:91, 1921. Bahams, Brace 9504.
= Wrightoporia bracei (Murr.) David. & Rachjenb.

P. calkinsii MYCOL 13:175, 1921. USA, Florida, Calkins 521.
= Wrightoporia avellanea (Bres.) Pouz. Lowe (1966) recognized it as a species of its own, separated from P. avellanea by wider hyphae.

P. cinereicolor MYCOL 12:87, 1920. Jamaica, Murrill 63.

= *Tinctoporellus epimiltinus* (Berk. & Br.) Ryv. as indicated by Lowe (1966:123).

P. cokeri MYCOL 12:306, 1920. USA, N. Carolina, Coker 1506.

= *Oxyporus latemarginatus* (Mont. & Dur.) Donk as indicated by Lowe (1966:17).

P. corioliformis MYCOL 12:86, 1920. Cuba, Shafer 253.

= *Ceriporia xylostromatoides* (Berk.) Ryv. as indicated by Lowe (1966:39).

P. cremeicolor MYCOL 12:85, 1920. Jamaica, Murrill & Harris 863.

= *Ceriporia xylostromatoides* (Berk.) Ryv.

P. cubitispora BTBC 67:65, 1940. USA, Florida, F. 18341.

= *Ceriporia alachuana* (Murr.) Hallenb.

P. distorta MYCOL 12:306, 1920. USA, N. Carolina, Murrill & House 427.

= *Antrodiella incrustans* (Berk. & Curt. ex Sacc.) Ryv.

P. dodgei MYCOL 13:87, 1921. USA, Wisconsin, Dodge.

= *Junghuhnia collabens* (Fr.) Ryv.

P. earlei MYCOL 12:86, 1920. Jamaica, Earle 297.

= *Antrodia lenis* (Karst.) Ryv.

P. ferruginicincta BTBC 65:660, 1939, USA, Florida, F. 9127.

= *Ceriporia ferruginicincta* (Murr.) Ryv. for a description see Lowe (1966:30) or Ryvarden & Johansen (1980:270).

P. flavida MYCOL 13:174, 1921. USA, Louisiana, Langlois 54.

= *Antrodia radiculosa* (Peck) Gilbn. & Ryv.

The identity was indicated already by Lowe (1966:116).

P. flavilutea MYCOL 13:176, 1921. Puerto Rico, Johnston 97.

= *Ceriporiopsis flavilutea* (Murr.) Ryv. comb. nov .Basionym: *Poria flavilutea* Murr. Mycologia 13:176, 1921.

For a description, see Lowe (1966:78). The species is undoubtedly close to *Fibuloporia donkii* Dom. by its yellowish soft basidiocarp and small ellipsoid spores.

P. floridae BTBC 65:659, 1939. USA, Florida, F. 16121.

= *Antrodiella subundata* (Murr.) Ryv.

P. heteromorpha MYCOL 12:92, 1920. Jamaica, Murrill & Harris 857.

= *Wrightoporia avellanea* (Bres.) Pouz.

P. holoseparans BTBC 65:660, 1939. USA, Florida, F. 16186.

= *Rigidoporus vitreus* (Pers.) Donk.

P. hondurensis MYCOL 12:303, 1920. Br. Honduras, Peck. 1907.

= *Grammothele hondurensis* (Murr.) Ryv. comb. nov. Basionym: *Poria hondurensis* Murr. Mycologia 12:303, 1920. Fig. 1.

Fruitbody resupinate, adnate and about 2 cm long and wide, up to 2 mm thick, fragile when dry. Pore surface cream to white, pores angular, irregular and in parts incised, split and not completely closed, 2-4 per mm, in parts with hyphal pegs, some small and as hydnoid protuberances, others like an initial development of a new partition wall, some pores without pegs at all. Trama and context white, the latter very thin. Hyphal system dimitic, generative hyphae with clamps, difficult to observe in dry material, 2-3 um wide, skeletal hyphae abundant, solid 2-3 um wide, unbranched and non-dextrinoid and mixed with abundant coarse crystalline material making proper observations difficult. Cystidia absent. Dendrohyphidia present, both along the dissepiments and in the hymenium, tubular with numerous small protuberances in the top, 2-4 um in diameter, often covered with grainy material in dry condition. Basidia observed both in horisontal and vertical parts of the tubes, tubular, in some cases apparently widened towards the apex, 8-15x3-5 µm and only observed with 2 sterigmata. Spores smooth thinwalled, hyaline, cylindrical to oblong ellipsoid, IKI negative, 5-8x3-3,5 µm. Known only from the type.

The species is transferred to *Grammothele* because of the irregular poroid hymenophore which indicate closer relationship with Corticiaceae (with genera like *Laeticorticium*) than Polyporaceae, and the dendrohyphidia which are so typical for *Grammothele*. *P. hondurensis* is related to *G. ochraceus* Ryv. from South-East Asia, but this species has also branched vegetative hyphae and distinctly longer and more cylindrical spores.

The occurrence of hyphal pegs is variable in the type, in some parts of the fruitbody they are rather conspicuous, in other parts almost absent. In the isotype in BPI, they are lacking almost completely and one wonder whether they represent a mature feature.

P. humilis MYCOL 11:232, 1919.
= *Antrodiella incrustans* (Berk. & Curt. ex Sacc.) Ryv. Murrills name was a nomen novum to replace *P. incrustans* Berk. & Curt. non Pers., unnecessarily so as Saccardo had validated Berkeley and Curtis' name when he transferred the species to *Poria*.

P. hymenicola MYCOL 12:305, 1920. USA, Maine, Murrill 28. Aug. 1905.
= *Skeletocutis nivea* (Jungh.) Keller.

P. jalapensis MYCOL 13:177, 1921. Mexico, Murrill 252.
= *Schizopora flavipora* (Cooke) Ryv. comb.nov. Basionym: *Poria flavipora* Cooke, Grevillea 15:25, 1886.

This seems to be the oldest basionym for the small-pored and small-spored taxon in *Schizopora*, previously called *S. trichilae* (van. Byl) Ryv. and probably also synonymous with *S. carneolutea* (Clel. & Rodw.) Pouz.

P. johnstonii MYCOL 12:303, 1920. USA, California, Johnston 252.
= *Tyromyces johnstonii* (Murr.) Ryv. for a description, see Lowe (1966:76) or Ryvarden (1976-78:470).

P. lacerata MYCOL 12:91, 1920. USA, Arkansas, Long 19777.
= *Oxyporus latemarginatus* (Mont. & Dur.) Donk.

P. lacteimicans BTBC 65:660, 1939, USA, Florida, F. 16199.
= *Antrodiella subundata* (Murr.) Ryv.

P. lacticolor MYCOL 12:84, 1920. Cuba, Earle & Murrill 636.

This type is completely sterile as already stated by Lowe (1966:134). Unripe basidia, 6-9x4-5 um, are common along the pores and the hyphal system is dimitic with skeletal hyphae (IKI negative and solid) and narrow (2-4 um wide) clamped generative hyphae. Macroscopically it reminds of an immature *Grammothele* sp. but no hyphal peges nor dendrohyphidia were observed that could link it with that genus. The name should be dropped from consideration.

P. lignicola MYCOL 12:307, 1920. Cuba, Earle & Murrill 482.
= *Schizopora flavipora* (Cooke) Ryv.

P. linearis MYCOL 12:303, 1920, Panama, Williams 1127.
= *Megasporoporia cavernulosa* (Berk.) Ryv.

P. monticola MYCOL 12:90, 1920. USA, Idaho, Weir, 61.
= *Antrodia* sp. The type is sterile and a reliable identification is difficult to establish.

P. montana MYCOL 12:307, 1920. Jamaica, Murrill 765.
= *Antrodia lenis* (Karst.) Ryv. as already indicated by Lowe (1966:98).

P. niveicolor MYCOL 12:84,1920. Jamaica, Murrill & Harris 1056.
= *Skeletocutis niveicolor* (Murr.) Ryv. comb. nov. Basionym: *Poria niveicolor* Murr. Mycologia 12:84, 1920. There is a description in Lowe (1966:40). However, the generative hyphae has clamps at the septa, although they are very difficult to observe (appr. 1 hours examination before one clamp was observed!). The skeletal hyphae are covered with numerous fine crystals of the type known from all species in the genus. The species will key at point 14 in David's (1982) monograph of the genus, and it is easily distinguished from the other species in the genus by its small spores (2,5-3x1,5-2 µm).

P. ochracea MYCOL 13:174, 1921. USA, Virginia, Murrill 183.
= *Schizopora paradoxa* (Fr.) Donk.

P. parksii MYCOL 13:175, 1921. USA, California, Parks 965.
= *Byssoporia terrestre* (Fr.) Lars. & Zak. as indicated already by Lowe (1966:38).

P. perextensa MYCOL 12:304, 1920. USA, Maine, Murrill 2520.
= *Anomoporia myceliosa* (Peck) Pouz. as already indicated by Lowe (1966:61).

P. polyporicola MYCOL 12:87, 1920. USA, Florida, Stanley 12895.
= *Byssoporia terrestre* (Fr.) Lars. & Zak as indicated by Lowe (1966:38).

P. regularis MYCOL 12:87, 1920. Jamaica, Murrill 703.
= *Trechispora regularis* (Mkrr.) Lib. for a description, see Lowe (1966:58).

Poria rhoadsii BTBC 66:33, 1939. USA, Florida, F. 18132.
= *Hapalopilus albo-citrinus* (Petch) Ryv.

P. rimosa MYCOL 12:91, 1920. New Mexico, USA, Long & Hedgecock. Oct. 1911.
= *Diplomitoporus rimosus* (Murr.) Gilbn. & Ryv. There is a description in Lowe (1966:97).

P. roseitingens MYCOL 12:305, 1920. Jamaica, Murrill 407.
= *Oxyporus latemarginatus* (Mont. & Dur.) Donk as indicated by Lowe (1966:18).

P. salicina MYCOL 12:304, 1920. USA, Pennsylvania, Sumstine 25.
= *Oxyporus latemarginatus* (Mont. & Dur.) Donk as indicated by Lowe (1966:18).

P. separans MYCOL 12:305. 1920. USA, New Hampshire, Wilson, July 6, 1917.
= *Oxyporus corticola* (Fr.) Ryv. as indicated by Lowe (1966:19).

P. subavellanea MYCOL 12:88, 1920. USA, Alabama, Earle 121.
= *Antrodia lindbladii* (Berk.) Ryv. as indicated by Lowe (1966:104).

P. subbadia MYCOL 13:93, 1921. USA, Alabama, Underwood Feb. 1896.
= *Ceriporia viridans* (Berk. & Br.) Donk as indicated by Lowe (1966:31).

P. subcollapsa MYCOL 12:90, 1920. Jamaica, Earle 68.
= *Ceriporia xylostromatoides* (Berk.) Ryv. as indicated by Lowe (1966:39).

P. subcorticola MYCOL 12:88, 1920. Mexico, Murrill 363.
= *Ceriporia xylostromatoides* (Berk.) Ryv. as indicated by Lowe (1966:39).

P. submollusca MYCOL 12:306, 1920. USA, Louisiana, Langlois 1883.
= *Ceriporia xylostromatoides* (Berk.) Ryv. as indicated by Lowe (1966:39).

P. subradiculosa MYCOL 13:175, 1921. Mississippi, USA, Earle 40.
= *Antrodia radiculosa* (Peck) Gilbn. & Ryv.

P. subundata MYCOL 13:86, 1921. Cuba, Underwood & Earle 1168.
= *Antrodiella subundata* (Murr.) Ryv. comb.nov. Basionym *Poria subundata* Murr. Mycologia 13:86, 1921.

For a description see Ginns (1980:1587). I prefer to place the species in *Antrodiella* as it has small spores and a dense fruitbody dominated by thickwalled skeletal hyphae. *Flaviporus* where it was placed by Ginns, I would like to preserve for those species which have abundant heavily encrusted cystidia. Ginns (op.cit.) stated that such were seen in *P. subundata*, but I did not observe them although lumps of crystals were common in the sybhymenium. Lowe (1966:25) stated their presences as uncertain "as there were crystaline masses of confusing similarity".

P. tenuipora MYCOL 12:85, 1920. Jamaica, Murrill & Harris 855.
= *Antrodia lenis* (Karst.) Ryv. as indicated by Lowe (1966:98).

P. umbrinescens MYCOL 12:83, 1920. Jamaica, Murrill 41.
= *Ceriporiopsis umbrinescens* (Murr.) Ryv. comb. nov. Basionym: *Poria umbrinescens* Murr. Mycologia 12:83, 1920. There is a good description in Lowe (1966:83-84). The species reminds about *Tyromyces hypolateritia* (Cooke) Ryv. which however has smaller spores and a very distinct dense resinous zone between the context and the tubes.

PYROPOLYPORUS Murr.

P. abramsianus Western Polyp. p. 26, 1915. USA, California, Santa Cruz. Nov. 1922, A.C. Herre.
= *Phellinus robustus* (Karst.) Bourd. & Galz. as indicated by Lowe (1957:55).

P. bakeri NAF 9:104, 1908. USA, Wisconsin, Baker. 47.
= *Phellinus robustus* (Karst.) Bourd. & Galz.) as indicated by Lowe (1957:55).

P. calkinsii BTBC 30:113, 1903. USA, Florida, 1886-87. Calkins.
= *Phellinus robustus* (Karst.) Bourd. & Galz. as indicated by Lowe (1957:55).

P. cedrelae NAF 9:105, 1908. Jamaica, Earle 450.
= *Phellinus robiniae* (Murr.) Ames as indicated by Lowe (1957:22).

P. cinchonensis MYCOL 2:195, 1910. Jamaica, W.A. & E. Murrill 643.
= *Phellinus cinchonensis* (Murr.) Ryv. For a description, see Lowe (1957:52) or Ryvarden & Johansen (1980:149).

P. crustosus BTBC 30:113, 1903. Jamaica, Rose Hill. Oct. 1902. Earle.
= *Phellinus robustus* (Karst.) Bourd. & Galz. as indicated by Lowe (1957:55).

P. dependens NAF 9:106, 1908. Cuba, Underwood & Earle 1508.
= *Phellinus dependens* (Murr.) Ryv. For a description, see either Lowe (1957:37) or Ryvarden & Johansen (1980:154).

P. earlei BTBC 30:116, 1903. USA, New Mexico, El Capitan Mts., 31. Aug. 1900. F. Earle.
= *Pyrofomes demidoffii* (Lév.) Kotl. & Pouz. as indicated by Lowe (1957:62).

P. grenadensis NAF 9:107, 1908. Grenada, Amardale, Feb.-Mar. 1906, H. Broadway.
= *Phellinus grenadensis* (Murr.) Ryv. For a description, see Lowe (1957: 25) or Ryvarden & Johansen (1980:171).

P. haematoxyli BTBC 30:117, 1903. Jamaica, Paradise, Murrill 424.
= *Phellinus robustus* (Karst.) Bourd. & Galz. as already indicated by Lowe (1957:55).

P. hydrophilus MYCOL 2:195, 1910. Jamaica, Monce Gap, E. & W.A. Murrill 717.
= *Phellinus sancti-georgii* (Pat.) Ryv. as already indicated by Lowe (1957:23).

P. jamaicensis BTBC 30:120, 1903. Jamaica, Earle.
= *Phellinus rhytiphloeus* (Mont.) Ryv. The type lacks setae in contrast to *P. calcitratus*, and cannot be placed in synonmy with that species as indicated by Lowe (1957:33).

P. lamaensis BTBC 34: 479, 1907. Philippines, Luzon, Lamae river. Nov. 1904, R. Williams.
= *Phellinus lamaensis* (Murr.) Heim. For a description, see Ryvarden & Johansen (1980:179).

P. langloisii BTBC 30:118, 1903. USA, Louisiana, St. Martinville, Oct. 1893, A.B. Langlois.
= *Phylloporia ribis* (Fr.) Ryv. as already indicated by Lowe (1957:19).

P. melleicinctus NYBG 8:150, 1912. Mexico, Tehuantepee, June 1910, C.R. Orcutt.
= *Phellinus rimosus* (Berk.) Pil. as already indicated by Lowe (1957:28).

P. merrillii BTBC 34:479, 1907. Philippines, Merrill 3570.
= *Phellinus merrillii* (Murr.) Ryv. For a description, see Lowe (1957:23) or Ryvarden & Johansen (1908:186). It may be that this species may be interpreted as an ungulate and smooth form of *P. robiniae* (Murr.) Kotl. & Pouz. There seem to be no microscopical differences between the two species.

P. praerimosus BTBC 30:115, 1903. USA, New Mexico, El Capitan Mt.28 July 1900, Earle.
= *Phellinus everhartii* (Ell. & Gall.) Ames. as already indicated by Lowe (1957:34). For a description, see Gilbertson (1979:60).

P. pseudosenex NAF 9:107, 1908. Nicaragua, 1891-92, C.L. Smith.
= *Phellinus nilgheriensis* (Mont.) Cunn.
Bondartseva & Herrera (1980:9) accept it is a species of its own without discussing its taxonomic concept. They place *Ph. nilgheriensis* in a different section characterized by a presence (among other characters) of setae. They have apparently been mislead by Cunninghams (1965:226) erroneous statement that the species has setae. In the type, however, no setae are present (Ryvarden & Johansen 1980:187).

P. robiniae BTBC 30:114, 1903. USA, Ohio, Lloyd 223.
= *Phellinus robiniae* (Murr.) Ames. For a description, see Gilbertson (1979:76). The species belongs in the difficult group around *Phellinus rimosus* where specific differentiation is based on host and macroscopical characters as all species in the group share the same sort of spores and a lack of setae.

P. robinsoniae NAF 9:108, 1908. Jamaica, Monkey Hill. July 11. 1904. M.J. Robinson.
= *Phellinus wahlbergii* (Fr.) Reid. as already indicated by Lowe (1957:59) as a synonym of *Fomes zealandicus*, another synonym of *Trametes wahlbergii* Fr.

P. roseocinereus NAF 9:104, 1908. Cuba, Earle & Murrill 561.
= *Phellinus roseocinereus* (Murr.) Reid. For a description, see Lowe (1957:51).

P. subextensus BTBC 35:413, 1908. Philippines, Mindanoa, Mt. Apo, April 22. 1904. Copeland.
= *Phellinus wahlbergii* (Fr.) Reid.

P. sublinteus NAF 9:110, 1908. Mexico, Topolobampo, March 1889, Stanley & Scully.
= *Aurificaria luteoumbrina* (Rom.) Reid.

P. subpectinatus NAF 9:109, 1908. Cuba, Earle & Murrill, 629.
= *Phellinus pectinatus* (Kl.) Quél as already indicated by Lowe (1957:17).

P. taxodii BTBC 65:651, 1939. USA, Florida, F. 16254.
= *Phellinus senex* (Nees & Mont.) Imaz.

P. tenuissimus BTBC 35:413, 1908. Philippines, Copeland 497.
= *Phellinus gilvus* (Schw.) Pat.

P. texanus NAF 9:104, 1908. USA, Texas, Long 327.
= *Phellinus robustus* (Karst.) Bourd. & Galz. as already indicated by Lowe (1957:55).

P. tricolor BTBC 35:413, 1908. Philippines, Curran 8933.
= *Phellinus tricolor* (Murr.) Kotl. For a description, see Ryvarden & Johansen (1980:223).

P. troyanus MYCOL 2:196, 1910. Jamaica, Cockpit Co. Murrill & Harris, 1909.
= *Phellinus nilgheriensis* (Mont.) Cunn.
Both Lowe (1957:26) and Bondartseva & Herrera (1980:3) accept the species as different from *P. pseudosenex* and *P. nilgheriensis* although then descriptions indicate only very slight differences in the microscopical characters, which in my opinion, are not sufficient to accept more than one species.

P. underwoodii BTBC 30:116, 1903. Puerto Rico, Como Springs. June-July 1901. Underwood & Greggs.
= *Phellinus rimosus* (Berk.) Pil. as already indicated by Lowe (1957:28).

P. williamsii BTBC 34:479, 1907. Philippines, Bataan prov. R.S. Williams. 150.
= *Phellinus lamaensis* (Murr.) Heim.

P. yacatanensis BTBC 30:119, 1903. Mexico, Yacatan, Millsprangh, 1898.
= *Phellinus linteus* (Berk. & Curt.) Teng. as already indicated by Lowe (1957:35).

RIGIDOPORUS Murr.

R. substereinus NAF 9:6, 1907. Cuba, Underwood & Earle 1121.
= *Antrodiella liebmannii* (Fr.) Ryv.
The type is disappeared today. Coll. 734 from same locality is selected as neotype.

SCUTIGER Paulet

S. cristatiformis Lloydia 6:227, 1943. USA, Florida, Dec. 11.1941. Murrill, no number.
= *Albatrellus cristatus* (Fr.) Kotl. & Pouz.

S. laeticolor BTBC 30:428, 1903. USA, Alabama, Underwood 370.
= *Albatrellus confluens* (Fr.) Kotl. & Pouz. as already indicated by Overholts (1953:216).

S. oregonensis MYCOL 4:93, 1912. USA, Oregon, Murrill 847.
= *Albatrellus pes-caprae* (Pers.:Fr.) Kotl. & Pouz. as already indicated by Overholts (1953:229).

S. skamanius MYCOL 38:348, 1946. USA, Washington, A.S. Rhoads, F. 19288.

= Albatrellus skamanius (Murr.) Pouz. For a description, see Pouzar (1972:199).

S. subradicatus BTBC 30:430, 1903. Canada, Ontario, Dearness, Sept. 1896.
= Polyporus melanopus Fr. as already indicated in Overholts (1953:232).

S. subrubescens BTBC 67:277, 1940. USA, Florida, West & Murrill, F. 18411.
= Albatrellus subrubescens (Murr.) Pouz. For a description, see Pouzar (1974:88).

S. tisdalei Lloydia 6:227, 1943. USA, Florida, W.B. Tisdale. F 19185.
= Amylosporus campbellii (Berk.) Ryv.

S. whiteae BTBC 30:432, 1903. USA, Maine, White 116.
= Albatrellus confluens (Alb. & Schw. Fr.) Pouz. as already indicated by Overholts (1953:216) and by Pouzar in herb NY.

SPONGIPELLIS Pat.

S. luridescens NAF 9:39, 1907. Jamaica, Halls Delight, Earle 114.
= Hexagonia leprosa Fr. The status of this species is a bit dubious as no spores have been observed, neither in the type of H. leprosa nor in Murrills type. It will be treated more in detail in a paper of polypores described by E. Fries.

S. luzonensis BTBC 34:437, 1907. Philippines, Luzon, Bataan prov. Elmer 6944.
= Trametes menziesii (Berk.) Ryv. The type is immature and sterile.

S. occidentalis NAF 9:38, 1907. USA, New York, Ithaca, Oct. 1899. K. Wiegaard.
= Spongipellis spumeus (Fr.) Pat. as already poitned out by Overholts (1953:318).

S. sensibilis MYCOL 4:93, 1912. USA, Washington, Murrill, 43.
= Tyromyces fragilis (Fr.) Donk. as already indicated by Overholts (1953:274).

SPONGIPORUS Murr.

S. altocedronensis NAF 9:30, 1907. Cuba, Underwood & Earle 1479.
= Coriolopsis sp. cf. C. substuppeus (Berk.) Ryv.

The type is young and immature, no hymenium is developed within the shallow and irregular pores. The context is very loose and fibrous, reminiscent of Funalia leonina, which however I have not seen reported from America. Furthermore, that species has a white context while that of Spongiporus altocedronensis is cinnamon.

TRAMETES Fr.

T. caespitosa BTBC 34:473, 1907. Philippines, Luzon, Bataan prov. Mt. Marivales, Nov. 1904, Elmer 6951.
= Trametes modesta (Fr.) Ryv.

T. conglobata BTBC 35:405, 1908. Philippines, Mindanao, Lake Lanao, Sept. 1907, M.S. Clemens.
= Fomitopsis rhodophaea (Lév.) Imaz.

T. humeana BTBC 65:656, 1939. USA, Florida, Gainsville, W.A. Murrill.
= Tyromyces humeana (Murr.) Lowe. There is a description in Lowe (1975:25).

T. insularis BTBC 35:405, 1908. Philippines, Merrill 5001.
= Heterobasidion insulare (Murr.) Ryv.

The species reminds about the widespread H. annosum (Fr.) Bref., but is separated by larger spores (5-7,5 x 4-5 µm - H. annosum: 3,5-5 x 3-4 µm) and a strong tendency to develop distinctly pileate basidiocarps, while those of H. annosum normally are resupinate to effused-reflexed. Otherwise the two species are similar although they have different cultural characteristics (K. Aoshima pers. comm.).

T. jalapensis NYBG 8:147, 1912. Mexico, Jalapa, Murrill 210.
= Trametes cingulata Berk.

T. jamaicensis MYCOL 2:191, 1910. Jamaica, Murrill 189.
= Antrodia malicola (Berk. & Curt.) Donk.

T. lamaensis BTBC 34:474, 1907. Philippines, Luzon, Bataan prov. Lamao river. Feb. 1904. R.S. Williams.
= Trametes lactinea Berk.

T. lignea NAF 9:44, 1907. Nicaragua, 1891-92. C.L. Smith.
= Fomitopsis meliae (Underw.) Gilbn.

T. luzonensis BTBC 34:474, 1907. Philippines, Luzon, Bataan prov. Elmer 6932.
= Trametes modesta (Fr.) Ryv. badly eaten by insects.

T. robiniophila NAF 9:.42. 1907. USA, Virginia, Murrill.
= Perenniporia robiniophila (Murr.) Ryv. for a description, see Ryvarden (1983:317).

T. rutilantiformis NYBG 8:147, 1912. British Honduras, 1907. Peck.

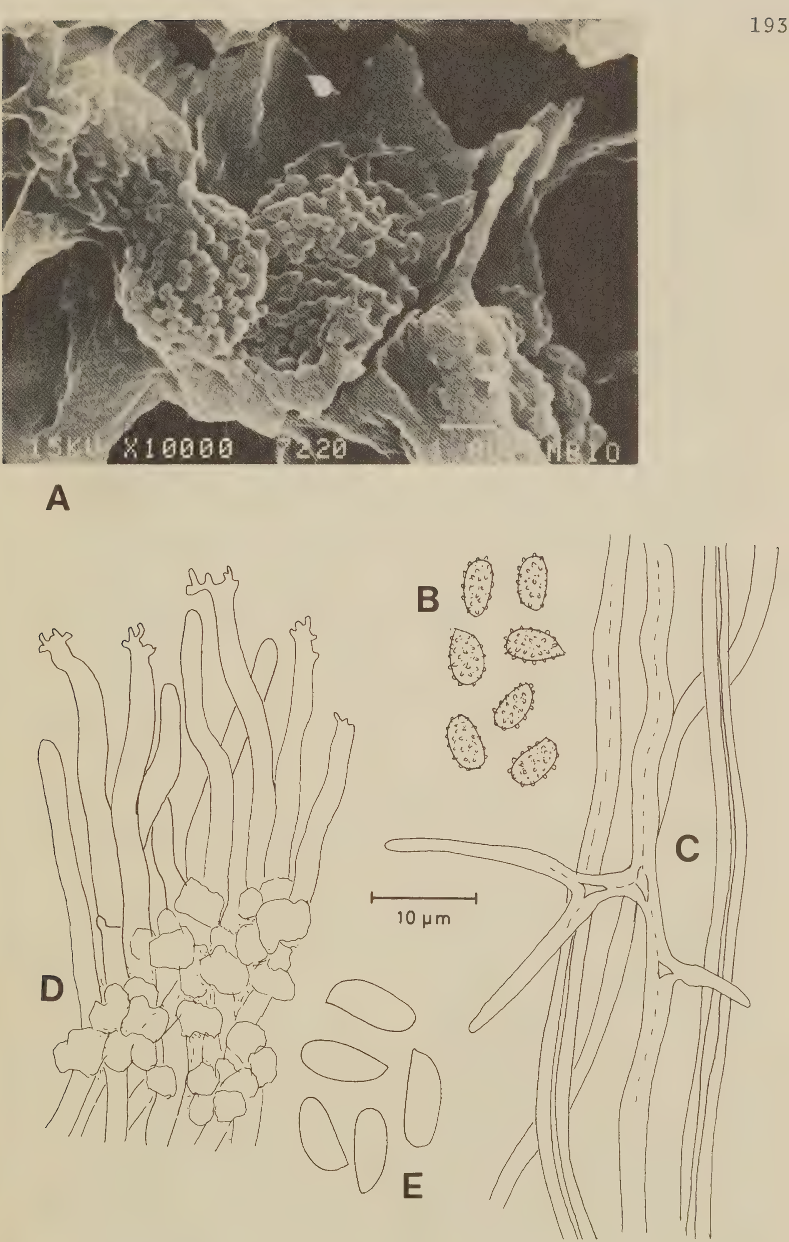
MURRILLOPORUS Ryv. nov. gen.

Generi Perenniporia affinis, sed differt sporis tenuitunicatis, asperulatis, non-dextrinoideis.

Type species: = Murrilloporus rutilantiformis (Murr.) Ryv. comb.nov. Basionym: Trametes rutilantiformis Murr. Bull. New York. Bot. Gard. 8:147, 1912. Fig. 1.

Basidiocarp pileate, sessile, triangular, dimidiate with contracted base, 3x4x1 cm, coriaceous, but light of weight, upper surface glabrous, slightly sulcate and with some scattered warts or tubercules, reddish brown to chestnut at the base and with a thin cuticle in section, margin sharp, pore surface white when fresh, ochraceous to cork-coloured today, pores round to angular, thinwalled, 5-6 per mm, a few larger, up to 3 per mm, tubes concolorous with pore surface, up 8 mm deep at the base, context coriaceous, homogeneous, up to 4 mm thick. Hyphal system dimitic, generative hyphae thinwalled, hyaline and with clamps at the septa, 2-3 µm wide, difficult to observe, skeletal hyphae totally dominating, solid, narrow, 2-3 µm wide, strongly dextrinoid, unbranched or sparingly dichotomously branched, in parts more branched and reminding about binding hyphae of the Bovista type, but such hyphae are rare. Basidia and cystidia not seen. Spores ellipsoid, asperulate, thin to very slightly thickwalled and non-dextrinoid, 4,5-5x2,5-3 µm.

This is a remarkable species, and its systematic position is unclear. The combination of a pileate basidiocarp, dextrinoid skeletal hyphae and asperulate spores are unique, but reminds slightly of Perenniporia, which however has smooth, thickwalled and mostly dextrinoid, truncate spores. Wrightoporia has dextrinoid skeletal hyphae and asperulate, but amyloid spores. Furthermore, all species in the genus are resupinate and light coloured, thus in


X10000
220
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10 µm
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E

Fig. 1. *Murrilloporus rutilantiformis* A) Ornamentation of spore-surface (scale = 1 um) B) spores C) vegetative hyphae from context. - *Grammothele hondurensis* D) hyphae from the dissepiments E) spores. From the lectotypes.

gross morphology is rather different from Trametes rutilantiformis. Haploporus Sing. is characterised by a pileate fruitbody with a trimitic hyphal system and asperulate dextrinoid spores. It has a strong odour of anise when fresh and is restricted to Salix in the Northern boreal zone. With its non-dextrinoid skeletal hyphae and dextrinoid spores it is rather deviating from T. rutilantiformis. In all cases, T. rutilantiformis will introduce a deviating element into the existing genera that, thus a new genus is proposed.

TYROMYCES Karst.

T. avellaneibus BTBC 65:657, 1939. USA, Florida, Murrill 1562.
= Tyromyces sp. The type is badly developed and weathered. The pores are contaminated with numerous foreign spores. The name should be dropped from consideration.

T. calkinsii NAF 9:32, 1907. USA, Florida, Calkins 619.
= Fomitopsis cfr. meliae (Underw.) Gilbn. The complex around this species and species like Trametes nivosa (Berk.) Murr. and T. palustris (Berk. & Curt.) Ryv. is a very difficult one, as they all have more or less the same microscopical characters.

T. carbonarius MYCOL 4:94, 1912. USA, Wash. Seattle, Murrill 64.
= Tyromyces stipticus (Fr.) Kotl. & Pouz. although the pileus is rather atypical. Lowe (1975:40) accept it as a species of its own.

T. cutifractus MYCOL 4:94, 1912. USA, Oregon, Murrill 1064.
= Tyromyces balsameus (Peck) Murr. as already indicated by Lowe (1975:59).

T. cinchonensis MYCOL 2:192, 1910. Jamaica, Murrill 500.
= Tyromyces floriformis (Quél.) Bond. & Sing.

T. ellisianus NAF 9:34, 1907. USA, New Jersey, Newfield, Ellis.
= Dichomitus squalens (Karst.) Reid as already indicated by Reid (1965:150).

T. elmeri BTBC 34:475, 1907. Philippines, Luzon, Baataan prov. Elmer 6945.
= Tyromyces duracinus (Pat.) Murr.

T. graminicola Tropical polypores p. 21, 1915. Bermuda, Harrington Sands, Brown & Britton 834.
= Amylosporus campbellii (Berk.) Ryv.

T. leucomallellus BTBC 67:63, 1940. USA, Florida, F. 18231.
Accepted species in the genus, for a description, see Lowe (1975:30).

T. magnisporus BTBC 67:64, 1940. USA, Florida, F 18231.
The type has not been found.

T. merrittii BTBC 35:406, 1908. Philippines, Luzon, Bataan prov., For. Bur. 8939. Accepted species in the genus.

Basidiocarp pileate, annual, imbricate, multiplex, fanshaped with tapering base, probably soft when fresh, light of weight and fragile when dry, 7-9x7-9 cm and up to 5 mm thick, upper surface ochraceous to sordid white, dull, finly tuberculate to warted and minutely velutinate, azonate, margin irregular, lobed and rounded. Pore surface greyish white when collected, today pale cork-coloured, pores round to angular, 3-4 per mm, tubes fragile, up to 3 mm long, concolorous with the pore surface, context fibrous and very brittle and easily crumbled, milk-white when fresh, today pale ochraceous, up to 4 mm thick at the base.

Hyphal system monomitic, generative hyphae with distinctly thickened walls, straight to sparingly branched, hyaline and with scattered large clamps, 3-6 um wide in the trama, up to 11 um wide in the context. Basidia and cystidia not seen. Spores ellipsoid, 5-6x3-3,5 um, thinwalled, hyaline and non-amyloid.

The description is based on that of Murrill, supplied with microscopical observations on the lectotype. The ellipsoid spores and the wide generative hyphae with thickened walls are important microscopical characters. In macromorphology it may remind of T. stipticus (Fr.) Donk, but this is a boreal species with smaller spores and much more narrow hyphae.

T. newellianus BTBC 67:64, 1940. USA, Florida, F. 18215.
= T. leucomallellus Murr. as already indicated by Lowe (1975:30).

T. nivosellus NAF 9:32, 1907. Cuba, Underwood & Earle 1114.
= Trametes nivosa (Berk.) Murr.

T. palmarum NAF 9:32, 1907. Cuba, Underwood & Earle 1142.
= Trametes nivosa (Berk.) Murr.

T. perdelicatus MYCOL 4:95, 1912. USA, Washington, Murrill 47.
= Accepted in the genus, for a description, see Lowe (1975:31-32). It comes very close to T. caesius, but is separated by having gloeopleurous hyphae.

T. pini-glabrae BTBC 67:65, 1940. USA, Florida, F. 18235.
= Skeletocutis amorphus (Fr.) Kotl. & Pouz. as already stated by Overholts (1953:428 - and confirmed by Murrill on the same page).

T. pseudolacteus BTBC 67:65, 1940. USA, Florida, F. 17396.
= Tyromyces fumidiceps Atk. as already indicated by Overholts (1953:428).

T. pseudotsugae MYCOL 4:95, 1912. USA, Washington, Seattle, Murrill 84.
= Tyromyces undosus (Peck) Murr. as already indicated by Lowe (1975:57).

T. semisupiniformis NYBG 8:148, 1912. Mexico, Jalapa, Murrill 53.
= Junghuhnia semisupiniformis (Murr.) Ryv. comb. nov. Basionym: Tyromyces semisupiniformis Murr., New York Bot. Gard. Bull. 8:148, 1912. Lowe (1975:47) kept the species in Tyromyces in spite of its dimitic hyphal system and large encrusted cystidia. Ginns (1980:1586) placed it in Flaviporus Murr. a genus he defined wider than I find acceptable. For a description see Ginns. op.cit. J. semisupiniformis comes close to Junghuhnia undigera (Berk. & Curt.) Ryv. but is separated by smaller spores.

T. smallii NAF 9:32, 1907. USA, Florida, J.K. Small & J.J. Cade.
= Tyromyces mollis (Fr.) Kotl. & Pouz. as already indicated by Lowe (1975:14).

T. subacuta BTBC 34:474, 1907. Philippines, Luzon, Bataan prov. Lamao river, Williams 56.
= Daedalea incana (Lév.) Ryv.

T. subchioneus BTBC 35:40, 1908. Phillipines, Mindanao, Mt. Apo. April 1904, Copeland 1074.
= Tyromyces cfr. lacteus (Fr.) Murr. The type is small and immature and it is difficult to ascertain its morphological features. The hyphae and spores are as in T. lacteus.

T. subcubensis BTBC 65:656, 1939. USA, Florida, F. 16240.
= Trametes cubensis (Mont.) Sacc.

T. submurina NAF 9:43, 1907. Jamaica, Earle 483.
= Fomitopsis meliae (Underw.) Gilbn.

T. subnivosa NAF 9:43, 1907. USA, Louisiana, Langlois.
= *Fomitopsis meliae* (Underw.) Gilbn. as already indicated by Overholts (1953:55).

T. subscutellatus MYCOL 2:191, 1910. Jamaica, Union Hill, Murrill 1129.
= *Antrodiella semisupina* (Berk. & Curt.) Ryv.

T. subserpens MYCOL. 12:108, 1920. Invalid name, nomen nudium. Most specimens filed under the name are *Megasporoporia setulosa* (Henn.) Rachj.

T. substipitatus MYCOL 4:96, 1912. USA, Washington, Murrill 75.
= *T. guttulatus* (Peck.) Murr. as already indicated by Lowe (1975:42).

T. tigertianus Lloydia 6:228, 1943. USA, Florida, F. 21541.
= *Tyromyces humeana* (Murr.) Lowe as indicated by Lowe (1975:25).

T. tiliophila NAF 9:33, 1907. Canada, Ont. Ottawa, Macoun 53.
= *Tyromyces guttulatus* (Peck) Murr. as already indicated by Overholts (1953:286). Lowe (1975:42) casts some doubt on the synonymy as he found the taste of the type of *T. tiliophila* not as resinous as that of *T. guttulatus*.

T. unguliformis BTBC 35:406, 1908. Philippines, Balabec Isl., March 1906, Mangubat, Bur. Sci. no 533.
= *Trametes unguliformis* (Murr.) Ryv. comb. nov. Basionym: *Tyromyces unguliformis* Murr. Bull. Torrey Bot. Cl. 35:406, 1908.

Basidiocarp sessile, dimidiate and semicircular, 5 cm wide, 7 cm long and 3 cm thick, woody hard when dry. No special taste. Pileus ochraceous, dull, azonate, finely tuberculate and slightly velvety to touch. Pore surface ochraceous, pores round, 5-6 per mm, tubes about 4 mm deep, concolorous with pore surface. Context up to 3 cm thick at the base, homogeneous, rather dense and pale ochraceous. Hyphal system dimitic, generative hyphae with clamps, 2-8 um wide, context dominated by skeletal hyphae, hyaline thickwalled to solid, 2-5 um, all hyphae IKI negative. Basidia and cystidia not seen. Spores cylindrical, thinwalled hyaline, 3,5-4x1,5 um. Known only from the type. Superficially it may remind of a small specimen of *T. pubescens* (Fr.) Pil. but this is a zonate species, besides that the spores are longer. *P. immaculatus* Lloyd, is probably (as indicated by Lowe in the Lloyd herb.) based on the same taxon. Lloyd's name is invalid, being a homonym of *P. immaculatus* Fr.

T. williamsii BTBC 34:475, 1907. Philippines, Mindanao, 1905. Williams 104.
= *Daedalea incana* (Lév.) Ryv.

ACKNOWLEDGEMENTS

The Research Council of Norway has very kindly supported this study financially for which I am very grateful. The staff of the New York Botanical Garden where most of the microscopical work was done during a long stay in 1980, has been most helpful to make my stay as profitable as possible. I have fond memories of the months spent in their herbarium. The staff of the Farlow and Kew herbaria have sent types for examination and my short visits to these places have been most helpful to complete this study. The herbarium of the Agricultural Experimental Station in Gainsville, Florida has made a considerable effort to trace some of Murrill missing types and truely contributed to the very low number which seemingly have disappeared.

Dr. D. Pegler of the Kew Herbarium has suggested linguistic improvements for which I am very grateful.

Last, but not least, my sincere thanks go to Professor J. L. Lowe for his continuous support. He made up a list of all polypores described by W.A. Murrill when I just in the passing asked him whether such a list existed. It has been of immense help and saved me numerous hours of tedious work.

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VERRUCULOSE ARTHROCONIDIA IN *MALBRANCHEA ARCUATA*

J. GUARRO[1], L. PUNSOLA[1], A.T. MARTINEZ[2] & M.J. FIGUERAS[1]

1 Dpto. Biología y Microbiología. Universidad de Barcelona.
Facultad de Medicina. Reus, Tarragona. Spain
2 Instituto "Jaime Ferrán" de Microbiología. Madrid. Spain

During an investigation of the keratinophilic fungi of soils in Catalunya, Spain, a *Malbranchea* characterized by formation of verruculose arthroconidia was isolated from garden soil. With the exception of the recently described *Malbranchea graminicola* (SIGLER et al.,1982), all of the species of *Malbranchea* have been reported to have smooth-walled arthroconidia (SIGLER & CARMICHAEL, 1976. OORSCHOT & DE HOOG, 1984). At first the Catalunya isolate was considered to be new; however, reexamination of the type strain of *M. arcuata* has shown the arthroconidia of this species to be verruculose in age (21 days old culture). The new isolate is identified as *M. arcuata* but some strains previously reported as *M. arcuata* are excluded on the basis of their smooth-walled arthroconidia (Dr. Sigler, personal communication). *M. arcuata* is briefly redescribed and illustrated.

Arthroconiodia are formed in the straight primary hyphae and on curved lateral branches. The arthroconidia of the primary hyphae are slightly broader (usually 3 µm in width) and are predominantly smooth-walled. The arthroconidia borne on the arcuate fertile hyphae are verruculose, initially hyaline, later tan, 2-2,5 (3) x 2,5-4,5 (6) µm (Figs. 1-6). The colonial morphology and growth rate has been previously described by SIGLER & CARMICHAEL (1976).

Material examined: FFBA 230 (UAMH 4456), garden soil, XI-1980, L. Punsola, Catalunya, Spain. UAMH 1861 (type).

We are grateful to Dr. Sigler (UAMH) for valuable suggestions for reviewing the manuscript and for providing the type strain of *M. arcuata*

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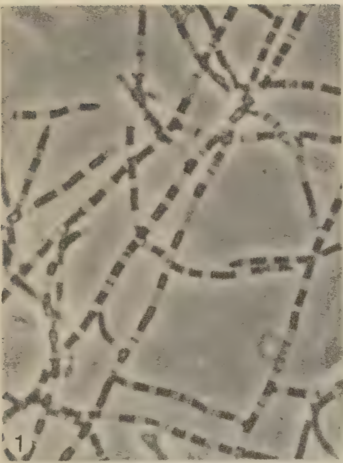
FIGURES

Fig. 1 Arthroconidia from 7 days old culture of *M. arcuata* FFBA 230. (x610, LM)

Figs. 2-6 Arthroconidia from 21 days old culture of *M. arcuata* FFBA 230: Figs. 2,3 and 6. UAMH 1861 (type): Figs. 4,5. (Fig. 2, x7500, SEM; Fig. 3, x7220, TEM; Fig. 4, x10200, TEM; Fig. 5, x21280, TEM; Fig. 6, x27930, TEM)



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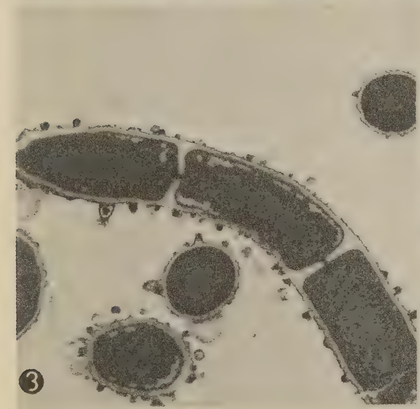

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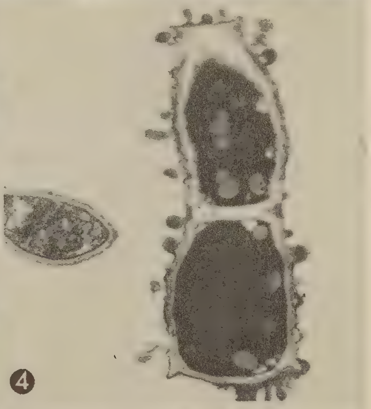

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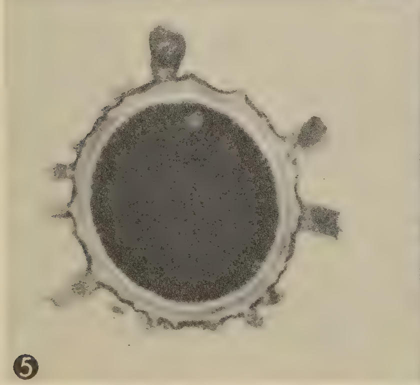

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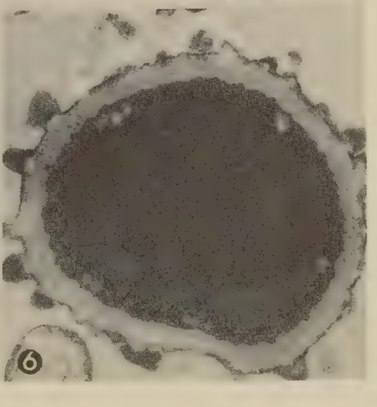

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MYCOTAXON

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PHOENICOID FUNGI: A PROPOSED TERM FOR FUNGI THAT FRUIT AFTER HEAT TREATMENT OF SUBSTRATES

STEVEN E. CARPENTER[1] AND JAMES M. TRAPPE[2]

[1]*Department of Forest Science*
Oregon State University
Corvallis, Oregon 97331-5704

[2]*U.S. Department of Agriculture, Forest Service*
Pacific Northwest Forest and Range Experiment Station
Forestry Sciences Laboratory
3200 Jefferson Way, Corvallis, Oregon 97331

ABSTRACT

The term "phoenicoid," based on the legendary phoenix that arises from the ashes, is proposed for fungi that pioneer on heat-treated substrates. Past terms coined for such fungi denote that they grow on burned materials; the same fungi, however, can fruit on substrates heated by steam or on fresh volcanic ejecta mixed with organic material.

After the May 1980 eruptions of Mount St. Helens in Washington State, we observed abundant fruiting of certain fungi on deposits of newly ejected tephra in the devastation zone north of the volcano (Carpenter et al., 1981). These were species that normally appear after prairie or forest fires. Although at Mount St. Helens the substrate was not burned in the usual sense, it had been heat treated and ejected from the volcano devoid of organic matter. Unburned organic matter, air-borne in the strong winds that accompanied the eruption, was mixed with the tephra during its deposition. Our observations on mycological succession immediately after the eruption convinced us that the terminology for fungi that establish after heating of substrates circumscribes the habits of those fungi too narrowly.

"Pyrophilous" was the adjective applied by Seaver (1909), El-Abyad & Webster (1968a, 1968b), and others to fungi that fruit on burned or steamed soils. It literally means "fire-loving," (Greek: *pyro-* = fire + *-philos* = loving). Fungi, however, neither love fire per se nor grow in it, so the term is inappropriate. Anyway, steamed soil or fresh, unburned organic matter mixed with heated volcanic ejecta have little to do with fire. Petersen (1970) coined the quaint term "fireplace fungi" in reference to species found in burned forests in Denmark. The situation at Mount St. Helens transcends the geographic implications of the term "fireplace:" the same kinds of fungi that Petersen discussed occurred over thousands of hectares of the volcanic devastation zone. Moser (1949) termed the same group of fungi "anthracobionts." The Greek word *anthrax* can be variously translated as coal, charcoal, or carbon. Moser presumably had charcoal in mind, but charcoal was no more part of the substrate that supported these fungi at Mount St. Helens than it is of steamed soil. Wicklow (1975) and Wicklow and Hirschfield (1979) used the term "carbonicolous fungi" in reference to species that fruit after fire; some of the same fungi responded similarly on steamed or autoclaved soil or peat (Danielson, 1984; Zak & Wicklow, 1978). This term is derived from *carbo*, the Latin equivalent of the Greek *anthrax*. Hence, it entails the same unseemly restrictiveness as does Moser's earlier term.

Fungi that establish in heat-treated substrates may do so for various reasons. Some, such as *Rhizina undulata* (Fr.) Fr., may require a heat shock to the spores to induce germination (Gremmen, 1971). Some may involve other mechanisms, e.g., ability to quickly occupy substrates in the absence of competition. Some may be mycorrhiza formers (Danielson, 1984). Whatever the phenomena involved, the general term used to refer to fungi that colonize the heat-treated niche should embrace all species involved, regardless of their adaptive mechanisms. Because of the variety of adaptations and substrates involved, it is difficult to coin an all-inclusive, technically descriptive term that does not also include fungi with habits quite beyond those intended. This vexing etymological challenge can be resolved by turning to classic mythology in the tradition of botanists over the centuries.

The legend of the phoenix originated in early Egyptian mythology; over the ensuing millenia it was variously permuted by the Greeks, Romans, and early Christians. The version best known today appeared in the 4th century A.D. in poems by Claudian and Lactantius (Barber, 1983). The poets described the phoenix as a fabulous bird that, when death draws near, builds a nest-pyre on which it sits and sings. The sun's rays ignite the nest, and both bird and nest are consumed to ashes. From the ashes arises a worm, which grows into a new phoenix. The phoenix so described was included in medieval beastiaries and was adopted as a Christian symbol of the resurrection. Contemporary allusions to the phoenix are commonly understood to represent life arising from the ashes _i.e._ heat-treated materials (Barber, 1983). "Pyrophilous, fireplace, anthricolous, or carbonicolous" fungi may not have beautiful feathers, but we see phoenicoid grandeur in those fungi that produce the first visible life on devastated, heat-treated substrates. We invite all who perceive that grandeur in these otherwise humble organisms to join in referring to them as "phoenicoid fungi," producers of life following the destruction wrought by intense heat. The term recognizes the capabilities of these fungi without designating any of the many possible mechanisms or substrates that give rise to them. It is not to be confused with the Latin *phoeniceus*, an adjective meaning "bright red." That term is derived from the name Phoenicia, a country celebrated in ancient times for its production of "Tyrian purple," a deep crimson dye (White, 1910).

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STEREUM FASCIATUM (SCHW.) FR. AND *S. LOBATUM* (KUNZE : FR.) FR. : TWO DISTINCT SPECIES

V. DEMOULIN

Département de Botanique - B.22,
Université de Liège, Sart Tilman,
B-4000 Liège, Belgium

ABSTRACT

Stereum fasciatum and *S. lobatum* are accepted as two distinct species. They both occur in North America and can be distinguished on the tomentum, the aspect of the hymenium and the yellow bleeding in *S. lobatum*. They are also distinct from the European species *S. insignitum* and tropical *S. australe*.

RESUME

Stereum fasciatum et *S. lobatum* sont considérées comme deux bonnes espèces. Elles croissent toutes deux en Amérique du Nord et peuvent être distinguées par leur tomentum et par l'aspect de l'hyménium et sa coloration jaune au froissement chez *S. lobatum*. Elles sont également distinctes de l'espèce européenne *S. insignitum* et du *S. australe* tropical.

In opposition to Burt (1920), Lentz (1955) reported that *Stereum fasciatum* and *S. lobatum* were but forms of a single variable species and adopted the name *S. ostrea* (Blume et Nees : Fr.) Fr. for this taxon. This position was widely accepted and even broader concepts were used by Welden (1971) who added *S. australe* C. Lloyd to the synonymy and by Jülich and Stalpers (1980) who also lumped with those species the European *S. insignitum* Quél.

In the past fifteen years I have had the opportunity to collect good material of these taxa as well as of the related *S. subtomentosum* Pouzar (1) and became convinced that clearly distinct species are involved. The problem is that the distinction is easiest to demonstrate with fresh material and using a good dissecting microscope. Herbarium taxonomists who do not use dissecting microscopes, an instrument not so popular with students of Hymenomycetes than with for example lichenologists, can easily find the situation confusing.

The basic observations that convinced me of the existence of two species in the so called *S. ostrea* complex in North America, were made while collecting with Professor A.H. Smith in the Waterloo Recreation Area, Washtenaw Co., Michigan. I there had the good fortune to find a dead lying tree of hardwood, possibly *Quercus*, colonized by three different Stereums. That those were different species could be ascertained by their different morphology, colour and reaction to bruising and also by the fact fruitbodies would be merging among members of each species but that clear cut borders were established in between the three groups of fruitbodies at their points of contact.

One of the species was quite different from the other two and referable to *S. complicatum* (Fr.) Fr. It will not be discussed here.

The other two clearly belong to the *S. ostrea* complex and on the basis of their tomentum it was possible to consider one (n° 4773) with relatively coarse tomentum and practically no baren zones with an exposed brown cortex as *S. fasciatum* sensu Burt (1920) and the other (n° 4772) with very short tomentum and conspicuous naked zones as *S. lobatum* in the sense of the same author. Collection n° 4772 showed a yellow change of colour when the hymenium was bruised while 4773 remained unchanged. This is in line with Welden (1971) observation that *S. fasciatum* does not bleed while *S. lobatum* bleeds yellow or red. That Welden attributes a red bleeding to *S. lobatum* is because he holds a broad species concept in which *S. australe* which is red bleeding is included. All the species of *Stereum* that I have had an opportunity to observe in the field are constant in the colour of their bleeding. *Stereum lobatum* as I interpret it is constantly a yellow bleeder, a reaction that can still be ascertained in some well preserved herbarium collections when they are chewed (this is still the case of n° 4772 after more than ten years in the herbarium).

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(1) I have not made personal collections of *S. australe* but have studied good material collected in Africa by J. Lambinon

The field observation mentioned above is important because it shows *Stereum fasciatum* and *lobatum* are two genetically distinct entities (no fusion of fruitbodies) which are morphologically recognisable with a number of distinctive features while growing on the same trunk. Thus it is not possible to consider them as ecological or geographical forms.

Careful examination of the specimens in the laboratory and study of further collections made during the past ten years lead me to the conclusion that the following characters are diagnostic for the two species.

	Stereum lobatum	*Stereum fasciatum*
Tomentum	Very short without individual tufts (felted appearance)	Coarser with individual tufts (hirsute appearance)
Colour of the hymenium	Pale ochraceous (pale and with a yellowish tinge) without distinct margin	Greyish (pale "café au lait") with a paler cream margin
Bleeding	yellow (rub moist specimens, chew dry ones)	none

Other characters are far from constant and if it is true, as stated by Burt (1920), that *S. lobatum* is thinner and can be spectacularly petaloid with a narrow attachment and a lobate margin it can also be effused reflexed (for example collection 5042). The fact that Burt defined his taxa on both a significant character (the tomentum) and a bad one (the shape of the fruitbody), ignored a good one (the bleeding) and did not clearly define another good one (the hymenium colour) probably explains why later authors were confused as to the distinction between those two species.

It should be emphasized that the difference in tomentum is not evident to the naked eye but is absolutely clear cut when using a dissecting microscope. The difference can also be observed under the microscope, *S. lobatum* having enrolled hairs while *S. fasciatum* has straight hairs forming the tufts visible with the dissecting microscope. It might also be that hairs are on the average thinner (for example often 4 μ) in *S. lobatum* than in *S. fasciatum* (often 6 μ) but microscopy being not necessary for delimiting the two species I have not made a statistically valid study of this character. This might eventually prove interesting to develop when the whole complex including the asiatic species is revised.

Personal collections (deposited in LG) on which all diagnostic features have been checked

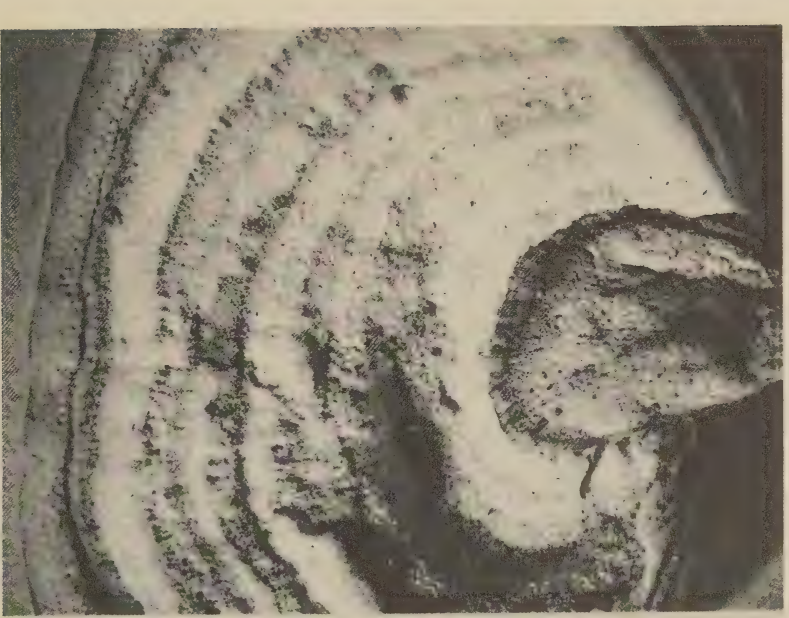
Stereum fasciatum

U.S.A., Iowa, Johnston Co., Newport township, Turkey Creek woods, sect. 14, range 6, T 80 N, 5 sept. 1973, hardwood log, n° 4677; Michigan, Livingstone Co., Oak Grove, 11 sept. 1973, fallen branch of *Quercus velutina*, n° 4694; Michigan, Washtenaw Co., Waterloo Recre. Area, 3 oct. 1973, fallen hardwood trunk (*Quercus* ?), n° 4773; New Jersey, Essex Co., South Mountain Reservation, 19 oct. 1970, old dead trunk, n° 4043 (bleeding not tested on this collection).

Stereum lobatum

U.S.A., Florida, Alachua Co., Devil's Millhopper (2 km NW from Gainesville), 26 aug. 1977, hardwood branch on soil, n° 5102; Michigan, Washtenaw Co., Waterloo Recr. Area, 3 oct. 1973, fallen hardwood trunk (*Quercus* ?), n° 4772; New York, Rensselaer Co., Averell Park, near Crooked Lake, 9 sept. 1977, on rotten hardwood log, n° 5210; New York, Westchester Co., Ward Poundridge Reservation, near Bergfield Picnic Area, 14 sept. 1976, n° 5042; Tennessee, Sevier Co., Porters Creek, Greenbrier Turnaround near Greenbrier Cove, E. of Gatlinburg, Gr. Smoky Mts Nat. Pk., elev. about 2000 ft, 7 sept. 1977, hardwood branch, n° 5182 bis; Virginia, Nelson Co., Raven Roost Overlook on Blue Ridge Pkwy., SW of Waynesboro, elev. 3200 ft, 13 oct. 1973, n° 4811.

Fig. 1. *Stereum lobatum*, Demoulin 4772. x 6.
Fig. 2. *Stereum fasciatum*, Demoulin 4773. x 6.



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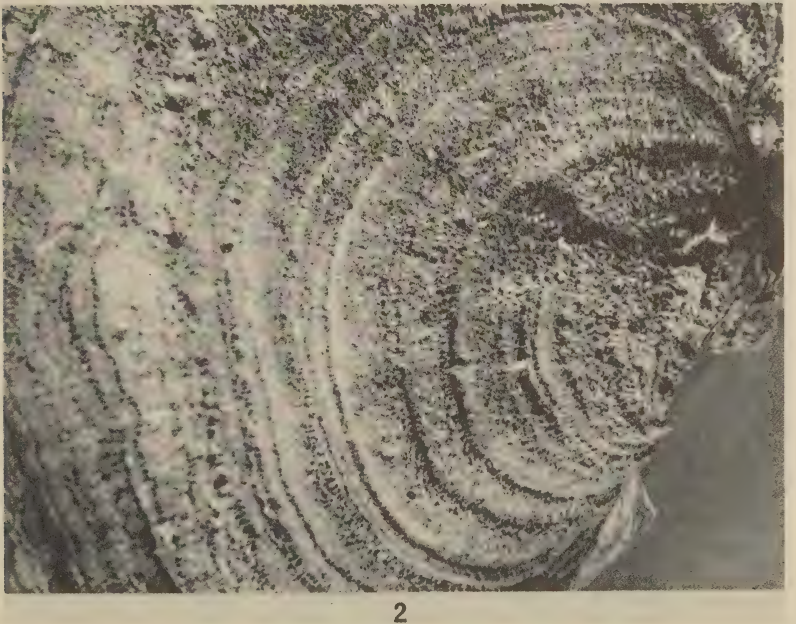

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Thailand, Khaoyai Nat. Pk. (E. of Saraburi, NE of Nakhon Nayok), near the Park Headquarter, tropical forest in a narrow valley, 5 dec. 1979, on fallen branches, n° 5457. This collection differs slightly from the North American material by its rusty coloured tomentum and greyish tinge on old hymenium making it look more like *S. fasciatum*. While further study of the group in Asia might show that this represents a distinct taxon (*S. concolor* (Jungh.) Mont. ?) the collection 5102 from Florida presents a few brown hairs next to the whitish ones as is also the case of an African collection (Rwanda, pref. Gisenyi, Sebeya valley, alt. 2100 m, 31 July 1974, lying log in forest, J. Lambinon 74/704 (LG)) otherwise very similar to for example 4772.

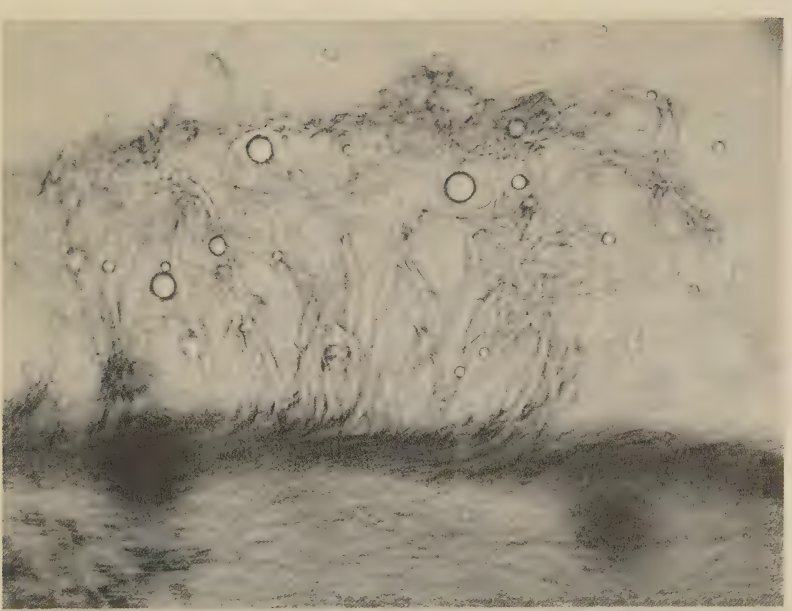
Geographical distribution

I have seen herbarium specimens in which the bleeding reaction is unknown but otherwise fit each of the two species from North, Central and South America and of *S. lobatum* but not *S. fasciatum* from Central Africa. *S. lobatum* seems also to occur in tropical Asia and Oceania but the few specimens I have seen have a browner tomentum (cited collections from Thailand and a collection from Fiji, Ovalou, dense forest alt. 100-300 m, 14 May 1953, A.C. Smith 7407, dupl. ex BPI, LG, a collection also noticeable through the lack of naked zones on the pileus). My present impression is that *S. fasciatum* is a New World species while *S. lobatum* is a pantropical one, spreading into areas of warm humid summers like eastern United States. Since *S. fasciatum* has been reported from Asia by Burt (1920) and its possible synonym *S. ostrea* (see below) is based on specimens from Java it would be extremely interesting to revise the group in Asia and Oceania.

Relationship to other species

Stereum australe C. Lloyd is another species with pseudoacanthophyses which extreme lumpers (Welden 1971, Jülich and Stalpers, 1980) synonymise with *S. lobatum* and

Fig. 3. *Stereum lobatum*, Demoulin 4772. Section swollen in chloral hydrate showing the tomentum. x 150.
Fig. 4. *Stereum fasciatum*, Demoulin 4773. As in fig. 3.



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S. fasciatum under the name *S. ostrea*. *S. australe* has a tomentum similar to that of *S. lobatum* to which it is certainly more closely related than to *S. fasciatum*, but is well characterized through its greyish lilacine hymenium which bleeds red. Under the microscope conducting hyphae with brown content can be seen. The material I have studied (eleven collections from Central Africa) also differs from *S. lobatum* in remaining smaller. Young specimens are usually conchiform. That the colour of bleeding is correlated to other characters shows bleeding colour is not determined by a polymorphic genetic system as probably assumed by lumpers. This species is known with certainly from tropical Americas up to southern US and from Africa from where I have seen good material collected by J. Lambinon in Burundi and several collections preserved in BR.

In Europe *S. lobatum* and *S. fasciatum* do not occur but are replaced by *S. insignitum* Quél. which is very close and differs through its very dark brown tomentum. The naked zones appear later and are also very dark, up to blackish. It is a species with a well delimited chorology and ecology being essentially limited to beeches in submediterranean areas. The relationship to *S. lobatum* is emphasized by a yellow bleeding that has apparently passed unnoticed because the fungus grows in rather dry forests and is often collected in a dry state. The yellow bleeding has been ascertained on the following collections :

France, Pyrénées-Orientales, Pic Neulos south of Sorède, alt. 1200 m, UTM DH 9563, 15/6/1975, V. Demoulin, on rotting beech wood; France, Corse, Forêt d'Aïtone, up from Evisa, alt. 1000 m, UTM MM87, 17/5/1980, V. Demoulin, on fallen beech branch; Grand-Duché de Luxembourg, Bois de Wellenstein, SW of Bons (Remich), 8/1976, H. Schmit, on beech. All specimens in LG.

The brown tomentum being a constant feature of *S. insignitum* one could wonder if just as *S. lobatum* is replaced in Europe by *S. insignitum* another species with brown but lighter coloured tomentum, that is *S. concolor* (Jungh.) Mont. does not replace it in Asia (see comments on Thai collection). Talbot (1954) who holds what I consider a very reasonable species concept in *Stereum* considers that the specimens referred to *S. concolor* represent a young form of *S. lobatum*. I have however only seen specimens with a continuous brown tomentum from the eastern old world tropics. I might however have not seen enough material and suppose it is wiser to retain at the moment a rather broad concept of *S. lobatum*.

It is already evident from the material I have examined that it is not possible to separate a large, dark tropical form of *S. lobatum* from a smaller, paler temperate North American one as suggested by Boidin (1960). I have examined the material studied by Boidin and kept in BR of this tropical form, called f. *intertropicale* by Boidin, but which should indeed be f. *lobatum*, as can be judged from the protologue of the species, and as ascertained by the examination of the type (Z. Pouzar, pers. comm.). Such large specimens with a rusty tomentum apparently do not occur in the North of the United States but my collection 5102 from Florida is intermediate by the possession of some brown hairs and more intermediate collections both through size and tomentum colour are to be found in the African material kept in BR and LG. Such intermediates especially occur in the mountain forests of eastern central Africa (for example J. Lambinon 74/704). A change in latitude or altitude can thus apparently influence the size of the fruitbodies and brown colour of the tomentum which are thus probably climate linked.

One should finally mention *S. subtomentosum* Pouzar a North temperate species recorded in Europe (where it seems to be extending) and Northern North America. It differs from *S. lobatum* and the other aforementioned species by the absence of pseudoacanthophyses a character Pouzar (1964) considers of prime importance. However, I believe it is rather closely related to *S. lobatum* and *S. insignitum* with which it shares the yellow bleeding. The tomentum which is whitish to pale yellowish brown, has however his own peculiarities with a tendency in young specimens to have fasciculate hairs and a paucity of naked zones which places it somewhat in between that of *S. lobatum* and *S. fasciatum*. The hymenium can also be reminiscent of *S. fasciatum* for it can be invaded by a greyish tinge and present a paler margin. Where it not for the absence of pseudoacanthophyses this species could easily pass for an hybrid between *S. lobatum* and *S. fasciatum*. One should note that it is only in the northern US that the three species cohabit.

Nomenclatural aspects

I have accepted Burt's use of epithets since I find his species concept approximately correct (except for his emphasis on fruitbody shape) and he had revised types or authentic specimens. One could however question his typification of *S. fasciatum* since the original diagnosis is more in line with *S. lobatum* (a fact he was, however, aware of).

If it seems in the interest of stability to follow as far as possible Burt's concept of *Stereum fasciatum* a more problematic issue is linked to the use of the epithet *ostrea*. On the basis of a specimen qualified of authentic Burt claims it to be synonymous with *S. fasciatum* but recognises he has not seen additional collections of *S. fasciatum* from Java (but well from Formosa). Further the epithet *ostrea* seems to apply better to *S. lobatum* and the original description applies well to that species or even better to *S. concolor*. I believe it is only by a monographic revision of the group in tropical Asia that one could correctly typify *S. ostrea* and show whether this is conspecific with *S. fasciatum*, *S. lobatum* or *S. concolor*. When this will be done *S. ostrea* might well become the correct name for one of those entities since *Thelephora ostrea* (1826) is older than *Th. lobata* (1828) and while *Th. ostrea* and *lobata* are both sanctioned at specific rank in Fries's Systema (ICBN art. 13), *Th. fasciata* is only accepted by Fries as *Th. versicolor* β *fasciata*. As to *Th. concolor* it dates from 1838. As *Stereum ostrea* has been used in a very broad sense, to use it in a narrow one would be confusing and should preferably be delayed until a narrower species concept is generally accepted.

For the same reason it is especially unfortunate that the use of *S. fasciatum* has recently been proposed in replacement of *S. ostrea* s.l. (Chamuris, 1984). Not only is this unfortunate because precedently one could use the name *S. fasciatum* and be unequivocally understood as speaking of the species as conceived here, but this is also nomenclaturally incorrect. The position of Chamuris stems from a misunderstanding of the quoted Korf (1982) paper on citation of sanctioned names. Under the present code, just as under the preceding ones, in case of reunion of *Stereum fasciatum* and *S. ostrea*, it is *S. ostrea* that must be used since *Thelephora ostrea* is sanctioned at specific rank,but not *Th. fasciata.*

Acknowledgments

I dedicate this paper to Professor A.H. Smith who did much to convince me of studying fungi in the field. I am thankful to Dr. Z. Pouzar and L. Ryvarden for critical reading of the manuscript and to the Director of the National Botanical Garden of Belgium (BR) for the loan of several African *Stereum* collections.

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STUDIES IN THE LICHEN FAMILY PHYSCIACEAE. VI. TWO SPECIES NEW TO NORTH AMERICA

THEODORE L. ESSLINGER

Department of Botany
North Dakota State University
Fargo, North Dakota 58105

SUMMARY

Two lichen species in the Physciaceae are reported as new to North America. Phaeophyscia insignis, *a sorediate species previously known from South Central Europe is reported from Kentucky, Maryland, Missouri, and South Carolina. The Japanese species,* Physconia kurokawae, *which contains gyrophoric acid, is reported from Minnesota and North Dakota.*

The following two species are now known from the North American lichen flora. The descriptions provided are based primarily on the North American material, although exotic material of each species was also studied.

PHAEOPHYSCIA INSIGNIS (Mereschk.) Moberg FIG. 1

Thallus small and orbicular, up to 1 or rarely 2 cm in diameter but often coalescing into somewhat larger patches, gray to gray-brown. Lobes flat, up to 0.5 mm broad, more or less appressed. Sorediate, the soralia laminal, usually round and weakly capitate, commonly as broad as or even slightly broader than the lobes (from 0.3 to 1 mm), soredia finely granular, 30-50 µm in diameter (dry). Lower surface more or less pale, almost white in part to pale brown, occasionally darkening in part to almost black, with sparse, more or less concolorous or darkening rhizines. Apothecia not seen by me (according to Moberg, 1978: apothecia up to 1 mm, spores 18-24 x 8-11 µm); pycnidia rare, conidia 3 x 1 µm, ellipsoid. Chemistry: no substances detected; both cortex and medulla are PD-, K-, C-, KC-.

At first glance, *Ph. insignis* seems almost to be a diminutive version of *Ph. orbicularis*. However, its small size and narrow lobes, its consistently paler (at least in part) lower surface and the well defined, capitate soralia which often exceed the breadth of the lobes, clearly distinguish *Ph. insignis* from *Ph. orbicularis*. The pale lower surface and laminal soralia might cause it to be confused with *Physcia melanchra* Hue, in which however, the lower cortex is much paler (white to tan) and distinctly prosoplectenchymatous. The small size and often closely appressed thalli of *Ph. insignis* may also allow confusion with one of the sorediate *Hyperphyscia* species [e.g., *H. adglutinata* (Flörke) Mayrh. & Poelt], which however, lack distinctive rhizines, among many other differences.

Phaeophyscia insignis was previously known only from South Central Europe (Moberg, 1978) and may prove to have a similarly narrow distribution in North America. Although presently known from only four localities in North America, this easily overlooked and obscure little species may prove to be more common here than the few available specimens would indicate. This species was previously reported from North America by me in a mimeographed key titled "Key to the Carolina Species of Physciaceae" which was distributed to participants at the 1981 meetings of the American Bryological and Lichenological Society in Highlands, N.C.

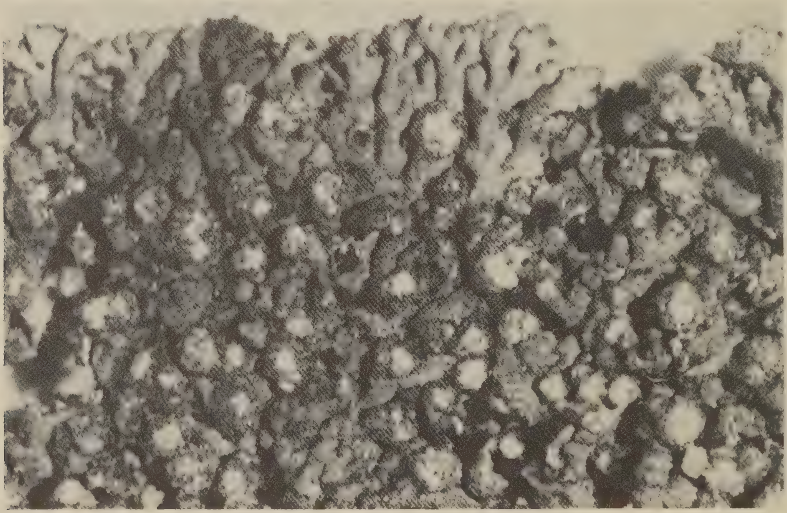

Figure 1. *Phaeophyscia insignis* (13X), *Skorepa 14277* (Herb. Essl.)

This species apparently grows almost equally commonly on bark and rock.

Specimens examined:

North America. Kentucky. Barren Co.: Mammoth Cave Nat. Park, 0.5 km NW of Sand Cave Entrance to Park, *Dey 10026* (Herb. Dey). Maryland. Baltimore Co.: Garrison, *Skorepa 14277* (Herb. Essl.); Owings Mills, *Skorepa 14295* (Herb. Essl.). Missouri. Christian Co.: 6 miles S of Springfield near James River, *Esslinger 7272* (Herb. EssL). South Carolina. Sumter Co.: 3 mi. W of Sumter, *Culberson 7767* (DUKE).

Europe. Switzerland, Lugano, *Mereschkowsky, Lich. Tic. Exs. 69* (FH, isolectotype of *Ph. insignis*), *Lich. Tic. Exs. 59* (FH, isolectotype of *Ph. virella* var. *gracilis* f. *ticinensis* Mereschk. = *Ph. ticinensis*). Yugoslavia. Dalmatia. Starigrad, in vallecula haud procul a faucibus Paklenica, *Vězda, Lich. Sel. Exs. 1194* (COLO, DUKE).

PHYSCONIA KUROKAWAE Kashiwadani

Thallus small to middle sized, up to 5 cm in diameter, gray-brown to brown, with a gray-white pruina over part (the lobe ends) or much of the surface. Lobes flat, 1-2 (-2.5) mm broan, loosely appressed to somewhat ascendant. Sorediate, the soralia primarily marginal or terminal on short side lobes, linear and more or less elongate or becoming in part labriform due to reflexed upper cortex, with more or less punctiform laminal soralia developing in some older thallus parts, these sometimes coalescing to cover the thallus center. Lower surface black inward, pale to almost white toward the lobe ends, with conspicuous, black, squarrosely branched rhizines. Apothecia and pycnidia not seen by me (according to Kashiwadani, 1975: apothecia rare, 1-3 mm in diameter, spores 25-32 x 12-15 µm). Chemistry: gyrophoric acid (by TLC); cortex PD-, K-, C-, KC-; medulla PD-, K-, C+ and KC+ rose or rose-red; soralia of many specimens are K+ yellow and KC+ yellow-orange.

This species, originally described from Japan (Kashiwadani, 1975), appears to be at least locally common on bark or occasionally on rock in the upper midwest states of North Dakota and Minnesota. Morphologically it is very similar if not identical to *Physconia detersa* (Nyl.) Poelt, which however, lacks gyrophoric acid and the C+ rose-red medullary reaction. Some of the collections cited below include mixtures of the two species.

Specimens examined:

North America. Minnesota. Becker Co.: 5 mi. E of Snellman, *Esslinger 4817* (Herb. Essl.); 22 mi. E of Detroit Lakes, *Esslinger 4902* (Herb. Essl.). Beltrami Co.: Pennington Orchid Bog, E of Kitchi Lake, *Esslinger 7021* (Herb. Essl.). Otter Tail Co.: ca. 7 mi. E of Pelican Rapids, Maplewood State Park, *Esslinger 5158* (Herb. Essl.). Polk Co.: ca. 1.5 mi. SW of Fertile, Agassiz Dunes, *Esslinger 6932* (Herb. Essl.). St. Louis Co.: SW shore of Kabetogama Lake, *Esslinger 6181* (Herb. Essl.). North Dakota. Barnes Co.: Clausen Springs Recreation Area, *Esslinger 4978, 5002* (Herb. Essl.); 12 mi. S of Valley City, *Esslinger 5099* (Herb. Essl.). Bottineau Co.: Lake Metigoshe State Park, *Esslinger 8779, 8780* (Herb. Essl.). Ransom Co.: 4 mi. WSW of McLeod, *Esslinger 4921* (Herb. Essl.); sec. 36, T136N, R53W, *Luddy 528* (NDA). Richland Co.: Mirror Pool State Game Preserve, *Luddy 402* (NDA); 10 mi. NNW of McLeod, *Esslinger 4874* (Herb. Essl.).

Japan. Prov. Tokachi: Oshirabetsu, hiroo-gun, *Kashiwadani 7487* (TNS); Taiki, Hiroo-gun, *Kashiwadani 7754* (TNS); Mt. Tsurugi, Kamikawa-gun, *Kashiwadani 7657* (TNS).

Acknowledgments: I wish to thank Dr. Hiroyuki Kashiwadani (TNS) for his kindness in loaning authentic specimens of *Physconia kurokawae* for comparison, Dr. Al Skorepa (Towson State Univ.) for his gift of the two Maryland specimens of *Phaeophyscia insignis*, and Dr. Jonathon P. Dey (Illinois Wesleyan Univ.) for his comments on the manuscript.

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MYCOTAXON

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STUDIES ON J. B. CLELAND'S FUNGAL HERBARIUM - 1: MELANOLEUCA (AGARICALES)

CHERYL A. GRGURINOVIC

Botanic Gardens of Adelaide and State Herbarium, North
Terrace, Adelaide, South Australia 5000.

Abstract

Examination of J.B. Cleland's fungal collections has revealed four species of the genus Melanoleuca Pat. One of these was recorded as Clitocybe media Peck and the other three were described as new species of Collybia : C. deusta, C. fusca and C. abutyracea. Three new combinations are proposed, and Melanoleuca clelandii is described. A key to these species is provided.

During the course of his long life John Burton Cleland (1878 - 1971) was an assiduous collector of Australian macrofungi and he accumulated the most extensive herbarium of these in existence. His main collecting areas were in New South Wales and South Australia and the majority of his collections are now housed at the State Herbarium of South Australia (AD). The results of his work with these collections were published alone, or with the assistance of other authors, especially Edwin Cheel of Sydney, in a series of papers from 1914 to 1948. After this, Cleland published intermittently on Australian fungi until 1970. Much of his earlier work was incorporated into his book "Toadstools and Mushrooms and other Larger Fungi of South Australia" (1934). This represented the only major work on the larger fungi of Australia to appear since the publication of M.C. Cooke's "Handbook of Australian Fungi" in 1892. Fifty years later, Cleland's book remains an important reference work on Australian macrofungi.

The genus Melanoleuca is not represented in his work and few members of this genus have been recorded from Australia. A test to show the amyloid ornamentation of the spores was unknown to early workers and this made the positive determination of the genus difficult, although Cleland did note roughened spore walls in Collybia deusta and C. fusca. Microscopic examination of J.B. Cleland's collections has revealed four members of this genus, recorded as either Collybias or Clitocybes. Fresh material could not be obtained to supplement the macroscopic descriptions provided by Cleland or to amplify distributional data.

The macroscopic descriptions in this paper are adapted from Cleland's handbook (1934) as well as the collection notes accompanying each specimen, with the exception of Melanoleuca clelandii, whose description is taken from Cleland (1919). Cleland recorded colours using the colour handbook of Ridgway (1912), quoting the colours in capital letters followed by the plate numbers in parentheses. In this study microscopic data was recorded from fragments of basidiocarps stained with ammoniacal Congo Red and then mounted in 3% potassium hydroxide.

KEY TO THE INCLUDED SPECIES OF MELANOLEUCA

1. Pleurocystidia common or rare..........................2.
1*. Pleurocystidia absent................................3.
  2. Pleurocystidia and cheilocystidia fusoid and septate, with apical cell being narrow, equal and approximately twice as long as the basal cell..............................M. abutyracea 1.
  2*. Pleurocystidia and cheilocystidia fusoid-ventricose and septate, with apical cell tapering to an acute apex and being approximately equal in length to the basal cell...........................M. deusta 2.
    3. Pileus fuscous. Lamellae becoming greyish. Stipe tinted with fuscous. Odour farinaceous.........................M. fusca 3.
    3*. Pileus smoky-brown in centre, the rest melleous. Lamellae whitish, then becoming rather cream-coloured. Stipe pallid whitish. Odour not distinctive......................M. clelandii 4.

1. Melanoleuca abutyracea (Clel.)Grgurinovic, comb. nov. - Fig. 1.

Collybia abutyracea Clel. in Trans. Roy. Soc. S. Australia 55:156. 1931 (basionym).

PILEUS up to 118 mm in diameter; at first convex with the margin inturned when young, then expanding to nearly plane or irregularly plane, more or less subumbonate; surface at first slightly velutinate, finally somewhat shining and subfibrillose; when young pallid, Isabella (XXX), Tawny Olive (XXIX) or Cream Buff (XXX) with a smoky tinge, becoming pallid biscuit-coloured, sometimes with a smoky or scorched tinge, sometimes with the umbo approaching Saccardo's Umber (XXXIX). LAMELLAE slightly sinuate to adnate; close, with lamellulae at periphery; up to 8 mm deep; rather dingy cream-coloured, becoming more biscuit-coloured with edge becoming scorched looking; not spotted. STIPE up to 51 mm long and 12.5 mm in diameter;

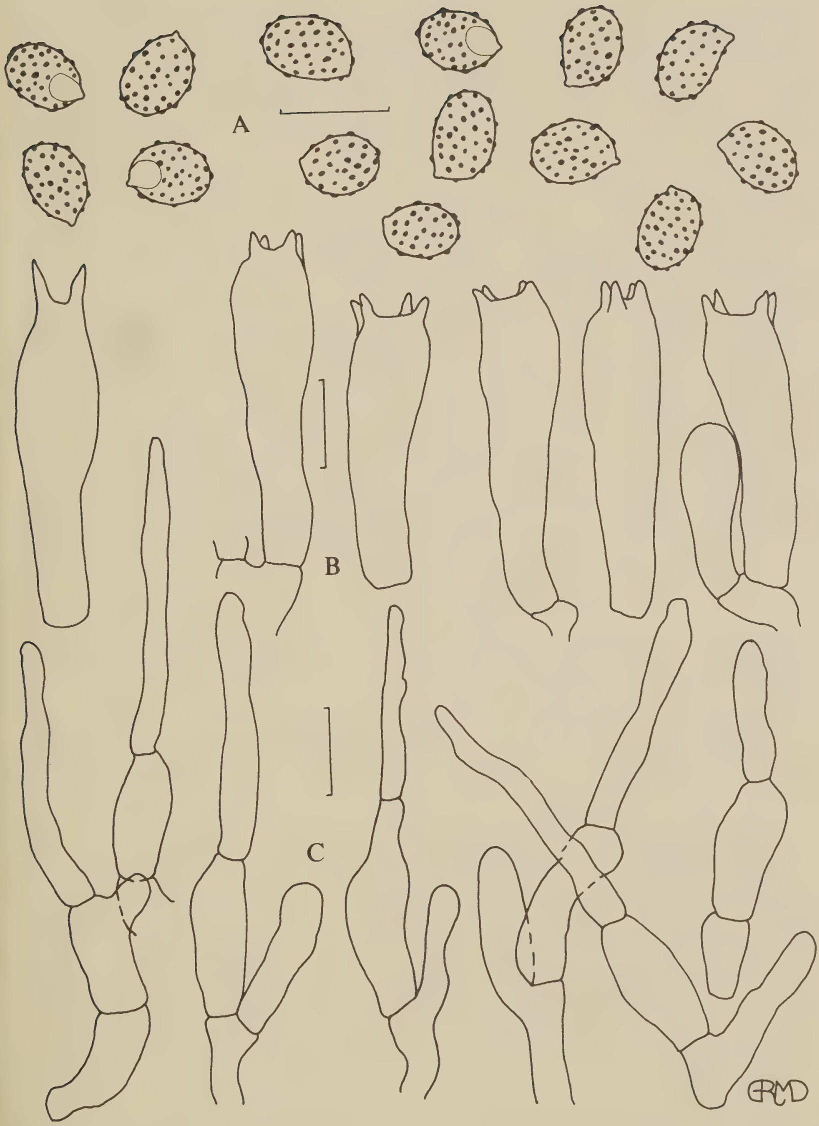

Fig. 1. Melanoleuca abutyracea. - A. Basidiospores. - B. Basidia. - C. Cheilocystidia. Bars = 10 µm.

central, rarely somewhat excentric; rather slender to moderately stout; base a little bulbous and with a mass of mycelial threads; surface slightly to markedly striate and mealy or fibrillose; evelate; dark smoky-brownish to pallid brownish, base whitish when young; consistency tough and cartilaginous, but continuous with the white flesh of the pileus; solid, not stuffed, breaking up into tough fibrils; becoming slightly brownish when cut. ODOUR not distinctive.

BASIDIOSPORES elliptical in profile and face view, verrucose with an amyloid plage; verrucae without anastomoses or ridges, strongly amyloid; [86/6][1], 7.2 - 9.3 - 10.4 ($\bar{x}$ = 8.5) x 5.0 - 6.4 - 7.2 ($\bar{x}$ = 5.7) µm; L/B[2] = 1.5. BASIDIA four-spored, occasionally two-spored; clavate; [34/5], 27.6 - 41.2 ($\bar{x}$ = 33.7) x 8.2 - 10.6 ($\bar{x}$ = 9.3) µm, with sterigmata up to 4.4 µm long. CHEILOCYSTIDIA scattered, making the lamella edge heteromorphous; shape fusoid and septate, with the apical cell being narrow, equal and approximately twice as long as the basal cell; apices encrusted with crystals?; [25/1], 30.0 - 64.0 ($\bar{x}$ = 44.8) x 4.8 - 8.8 ($\bar{x}$ = 6.7) µm. PLEUROCYSTIDIA rare; similar to cheilocystidia. HYMENOPHORAL TRAMA generally with epicellular brownish granular pigment. PILEAL SURFACE of repent, interwoven, filamentous and smooth-walled hyphae with brownish-yellow plasmatic pigment, [33/1], 2.4 - 10.0 ($\bar{x}$ = 5.4) µm in diameter; pileocystidia absent. STIPE tissue with epicellular brownish granular pigment; caulocystidia absent. CLAMP CONNECTIONS absent.

HABIT, HABITAT and PHENOLOGY:- scattered to gregarious, terrestrial amongst grass, pine needles or leaves. Specimens collected between June and August.

MATERIAL:- NEW SOUTH WALES: Mosman, 2.5.15, AD 3760. SOUTH AUSTRALIA: Beaumont, 4.7.20, AD 3748; 9.7.21, AD 3749; 14.7.23, AD 3752; 21.6.25, AD 3747. Belair National Park, 5.7.24, AD 3750.

Collybia abutyracea has been recorded from Victoria, New South Wales and Western Australia as well as South Australia (Young, T. 1982). *Collybia butyracea*, the species with which Cleland considered it to be related, has also been recorded as widespread (Eygelsheim, W.F.T. 1981; Macdonald, R. & Westerman, J. 1979; Sinnott, N.H. 1976; Willis, J.H. 1963). However, it is probable that many of these collections cannot be referred to *Melanoleuca abutyracea*. The specimen illustrated by Young (1982) is a species of *Collybia* and it is likely that the other records represent a number of different species.

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[1] [86/6], eighty-six measurements from six collections (see Bas, C., p. 290 (1969)).

[2] L/B., length-breadth ratio.

The large basidiocarps, brownish coloration, broad lamellae, and slightly to markedly striate, mealy or fibrillose stipe, indicate M. abutyracea should be incorporated in section Melanoleuca.

2. Melanoleuca deusta (Clel.)Grgurinovic, comb. nov. - Fig. 2.

Collybia deusta Clel. in Trans. R. Soc. S. Australia 55:156. 1931 (basionym).

PILEUS up to 75 mm in diameter; at first deeply convex with margin incurved when young, becoming irregularly convex to plane and somewhat umbonate or slightly depressed in centre; surface smooth to subtomentose; smoky brown, scorched brown, Snuff Brown (XXIX) or Buff Brown (XL); flesh white and thin. LAMELLAE adnate or sinuately adnate, occasionally with a decurrent tooth; close, with lamellulae at periphery; width narrow, up to 6.5 mm deep; pallid dingy greyish, pallid dingy buff or pallid with greyish-brown tint. STIPE up to 65 mm in length and 6 - 9 mm in diameter; slender and central; equal or slightly attenuated upwards and with the base slightly swollen into a knob; surface fibrillose to fibrously striate; evelate; concolorous with pileus, but paler, pallid above; consistency cartilaginous, differing from flesh of pileus; solid or occasionally stuffed; flesh whitish to brownish. ODOUR not distinctive.

BASIDIOSPORES elliptical in profile and face view; verrucose with an amyloid plage; verrucae without anastomoses or ridges, strongly amyloid; [68/7], 7.0 - 10.0 ($\bar{x}$ = 8.2) x 4.8 - 6.4 ($\bar{x}$ = 5.7) µm; L/B = 1.4. BASIDIA four-spored, occasionally two-spored; clavate; [46/5], 25.6 - 38.0 ($\bar{x}$ = 31.4) x 8.0 - 11.0 ($\bar{x}$ = 9.7) µm, with sterigmata up to 4.0 µm long. CHEILOCYSTIDIA scattered to common, making the lamella edge heteromorphous; shape fusoid to fusoid-ventricose, septate with the apical cell tapering to an acute apex and being approximately equal in length to the basal cell; apices encrusted with crystals; [17/1], 36.0 - 52.0 ($\bar{x}$ = 43.0) x 5.6 - 8.6 ($\bar{x}$ = 7.1) µm. PLEUROCYSTIDIA scattered; similar to cheilocystidia; [13/4], 37.2 - 63.2 ($\bar{x}$ = 48.5) x 6.0 - 10.2 ($\bar{x}$ = 7.4) µm. HYMENOPHORAL TRAMA consisting of hyaline, thin-walled and smooth-walled hyphae. PILEAL SURFACE of repent, interwoven, filamentous and smooth-walled hyphae with brown plasmatic pigment, [35/1], 2.6 - 8.0 ($\bar{x}$ = 5.6) µm in diameter; pileocystidia absent. CAULOCYSTIDIA absent. CLAMP CONNECTIONS absent.

HABIT, HABITAT and PHENOLOGY:- scattered to gregarious, terrestrial amongst grass or in sandy soil or litter under Melaleuca, Eucalyptus etc. Specimens collected between May and August.

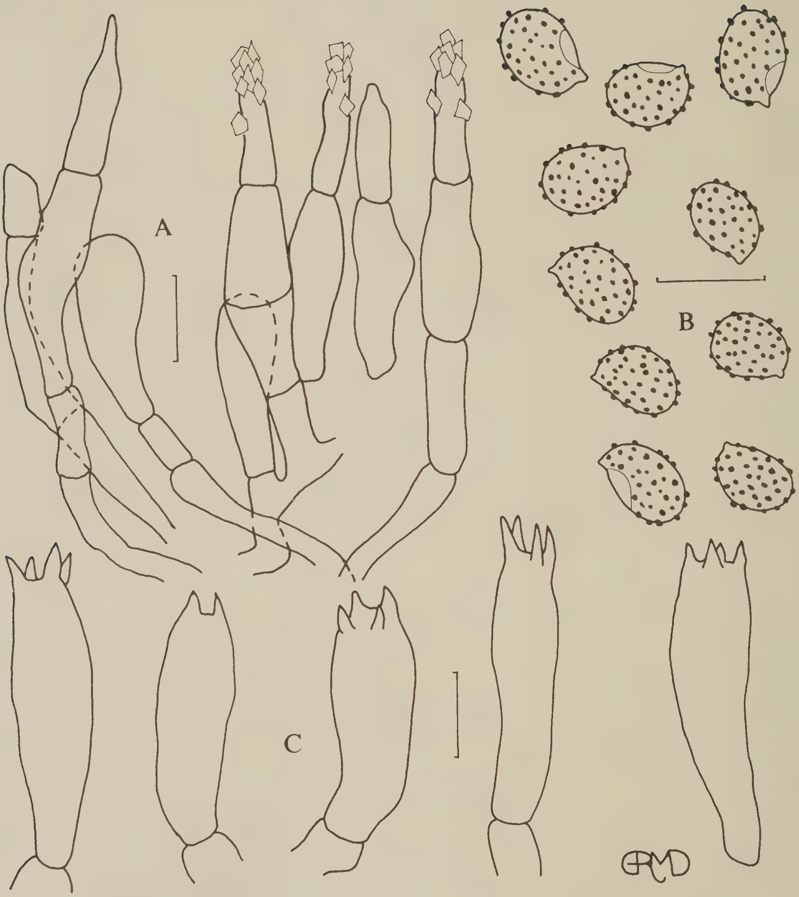

Fig. 2. Melanoleuca deusta. - A. Cheilocystidia. - B. Basidiospores. - C. Basidia. Bars = 10 µm.

MATERIAL:- SOUTH AUSTRALIA: Inman River, Victor Harbour, AD 3778 (holotype). Kinchina, 7.7.23, AD 3771; 8.6.25, AD 3769; 1.8.25, AD 3770; 29.5.26, AD 3768. Belair, 5.7.24, AD 3772. Encounter Bay, 5.31, AD 3773. Baker's Gully, Clarendon, 25.6.27, AD 3775. Enfield, 13.8.27, AD 3776.

The large basidiocarps, brownish coloration and fibrous to fibrously striate rather than furfuraceous pubescent or squamulose stipe, indicate that M. deusta is a member of section Melanoleuca. Cleland had reservations about the conspecifity of his collections from the Inman River at Victor Harbour (holotype) and his collections from Kinchina. Microscopic examination of these collections has shown them to be conspecific.

Melanoleuca deusta can be distinguished from M. fusca, a species with which it may be confused, by its brownish rather than fuscous coloration and its adnate to sinuately adnate gill attachment, which differs from the slightly to deeply sinuate attachment found in M. fusca. Melanoleuca deusta has no distinctive odour, whereas M. fusca has a farinaceous odour. An obvious microscopic difference between the two species is the absence of pleurocystidia in M. fusca.

3. Melanoleuca fusca (Clel.)Grgurinovic, comb. nov. - Fig. 3.

Collybia fusca Clel. in Trans. R. Soc. S. Australia 57:188. (1933) (basionym).

PILEUS 31 - 93 mm in diameter; convex, slightly umbonate with margin inturned when young, finally often somewhat concave; surface dull, apparently slightly viscid when moist, lighter than Fuscous, or Fuscous or Fuscous Black (XLVI); flesh pallid greyish, thick over disc and then attenuated outwards to margin. LAMELLAE slightly to deeply sinuate, or sometimes adnate with a tendency to a decurrent tooth; up to 10 mm deep; spacing moderately close; lamellulae at periphery; considerably paler than Light Drab (XLVI), when old decidedly greyish. STIPE 31 - 93 mm long and 5 - 8 mm in diameter; rather slender to moderately stout; equal, but with base slightly swollen and with a few darker cobweb-like fibrils; mealy above and slightly fibrillose below; evelate; solid to stuffed; cartilaginous; pallid tinted with drab or fuscous, becoming darker below. ODOUR farinaceous.

BASIDIOSPORES elliptical in profile and face view; verrucose with an amyloid plage; verrucae without anastomoses or ridges, strongly amyloid; [52/2], 7.0 - 9.0 ($\bar{x}$ = 7.9) x 4.8 - 6.4 ($\bar{x}$ = 5.4) µm; L/B = 1.5. BASIDIA four-spored; cylindrical to clavate; [26/2], 27.4 - 42.4 ($\bar{x}$ = 35.4) x 8.0 - 10.0 ($\bar{x}$ = 8.7) µm, with sterigmata up to 5.0 µm long. CHEILOCYSTIDIA scattered, making the lamella edge heteromorphous; shape fusoid-ventricose, septate with the apical cell tapering to an acute apex and being approximately equal in length to the basal cell; apices encrusted with crystals; [6/1], 40.1 - 49.6 ($\bar{x}$ = 43.9) x 6.6 - 9.0 ($\bar{x}$ = 8.1) µm. PLEUROCYSTIDIA absent. HYMENOPHORAL TRAMA consisting of hyaline, thin-walled and smooth-walled hyphae. PILEAL SURFACE of repent, interwoven, filamentous and smooth-walled hyphae with brownish-yellow plasmatic pigment, [31/1], 2.4 - 6.6 ($\bar{x}$ = 5.4) µm in diameter; pileocystidia absent. CAULOCYSTIDIA absent. CLAMP CONNECTIONS absent.

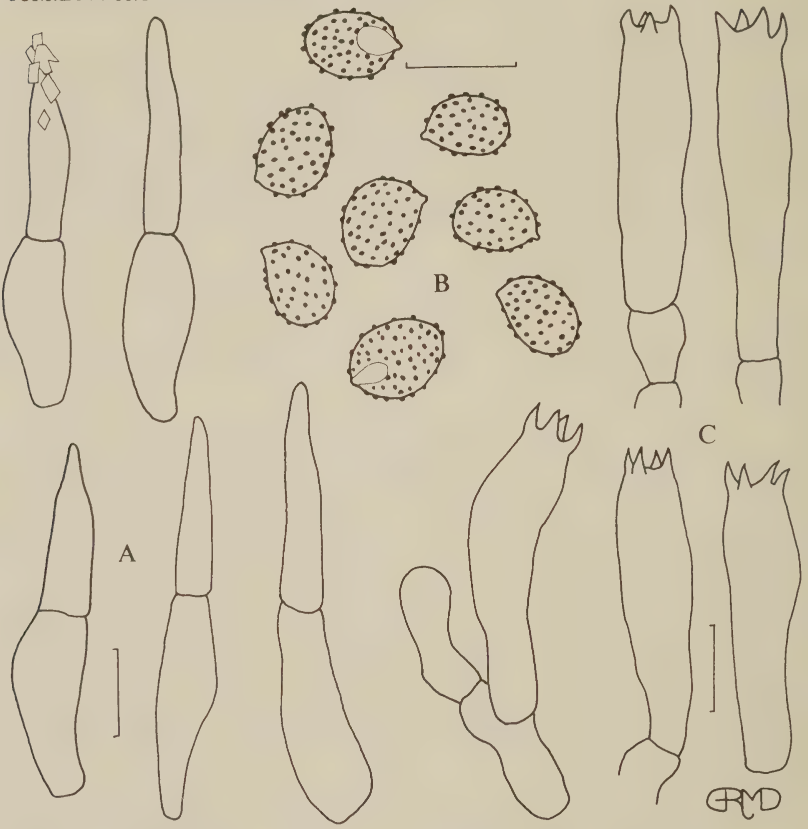

Fig. 3. Melanoleuca fusca. - A. Cheilocystidia. - B. Basidiospores. - C. Basidia. Bars = 10 µm.

HABIT, HABITAT and PHENOLOGY:- scattered to gregarious, terrestrial in grass under Eucalyptus. Specimens collected in June.

MATERIAL:- SOUTH AUSTRALIA: Belair National Park, 20.6.31, AD 3791; Eagle-on-the-Hill, 18.6.32, AD 3792.

The large basidiocarps, fuscous coloration, broad lamellae and stipe, which is mealy above and slightly fibrillose below, indicate M. fusca is a member of section Melanoleuca.

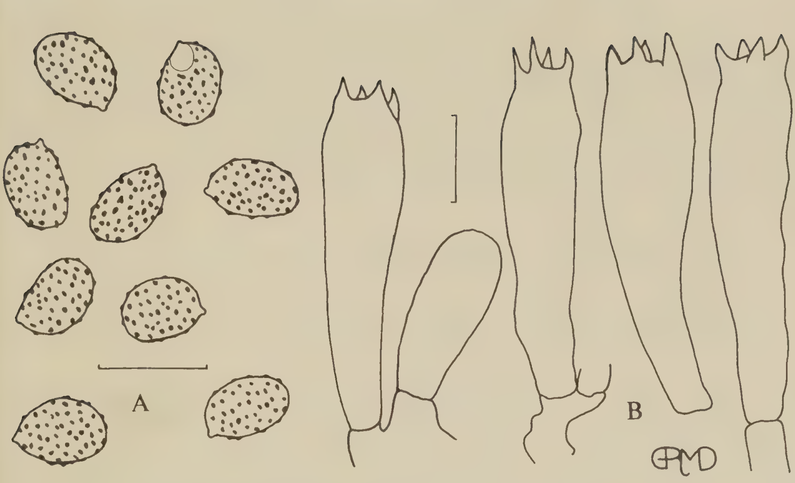

Fig. 4. Melanoleuca clelandii. – A. Basidiospores. – B. Basidia. Bars = 10 µm.

4. Melanoleuca clelandii Grgurinovic, spec. nov. – Fig. 4.

Misapplied name. – Clitocybe media Peck in Trans. R. Soc. S. Australia 43:268 – 269. 1919.

Pileus usque ad 152 mm in diametro, convexus, tum planus vel leviter sursum obversus, aliquot irregularis et undulatus, subgibbosus, cinereo-fuscus in centro, cetera melleus. Lamellae adnatae, confertae, albae vel cremeae. Stipes usque ad 44 mm longus et 19 mm in diametro, leviter fibrillosus vel fibrose striatus, sine annulo, albus. Odor indistinctus. Sporae 8.0 – 10.4 ($\bar{x}$ = 9.0) x 4.9 – 7.2 ($\bar{x}$ = 5.7) µm; L/B = 1.6; ellipticae, verrucosae amyloideae; cheilocystidia non vide; pleurocystidia nulla.
Holotypus : AD 3544.

PILEUS up to 152 mm in diameter; convex, then plane or a little upturned, somewhat irregular and wavy, subgibbous, matt; centre smoky-brown, the rest moist-looking, yellowish stone-brown; flesh white, moist-looking in places. LAMELLAE adnate; close, with lamellulae at periphery; whitish, then rather cream-coloured. STIPE up to 44 mm long and 19 mm in diameter; slender to stout, generally rather attenuated in the middle; slightly fibrillose or fibrously streaked; evelate; solid; pallid whitish. ODOUR not distinctive.

BASIDIOSPORES elliptical in profile and face view; verrucose, with amyloid plage; verrucae without anastomoses or ridges, strongly amyloid; [44/3], 8.0 – 10.4 ($\bar{x}$ = 9.0) x 4.9 – 7.2 ($\bar{x}$ = 5.7) µm; L/B = 1.6. BASIDIA four-spored, occasionally two-spored; clavate; [28/1], 30.8 – 46.8 ($\bar{x}$ =

36.2) x 9.2 - 12.4 ($\bar{x}$ = 10.4) μm, with sterigmata up to 4.8 μm long. CHEILOCYSTIDIA not observed, but lamellae edges generally damaged. PLEUROCYSTIDIA absent. HYMENOPHORAL TRAMA consisting of hyaline, thin-walled and smooth-walled hyphae. PILEAL SURFACE of repent, interwoven, filamentous and smooth-walled hyphae, [33/1], 3.6 - 9.6 ($\bar{x}$ = 5.9) μm in diameter; pileocystidia absent. CAULOCYSTIDIA absent. CLAMP CONNECTIONS absent.

HABIT, HABITAT and PHENOLOGY:- scattered to gregarious, terrestrial amongst grass. Specimens collected in June.

MATERIAL:- SOUTH AUSTRALIA: Mt Lofty, 16.6.17 & 23.6.17 and Beaumont, 22.6.17, AD 3544 (holotype).

This species of *Melanoleuca* was recorded incorrectly as *Clitocybe media* Peck (1919), a synonym of *C. clavipes* (Fr.)Kummer, and the species which Bigelow (1982) selected as the type species of the genus *Clitocybe*. The large basidiocarps, brownish to melleous coloration and slightly fibrillose to fibrously streaked stipe indicate *Melanoleuca clelandii* is a member of section *Melanoleuca*.

ACKNOWLEDGEMENTS

I would like to thank Dr H. Toelken for preparing the latin description of *Melanoleuca clelandii* and Mr G. Dashorst for preparing the figures for publication. I would also like to thank Mr J. Simpson for his helpful advice and Dr R. Watling for reviewing the manuscript.

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A REVISION OF EXARMIDIUM (ASCOMYCETES)

MARGARET E. BARR AND JEAN R. BOISE[1]

Department of Botany, University of Massachusetts,
Amherst, Massachusetts 01003

SUMMARY

Exarmidium, typified by *E. hysteriiforme*, is redescribed and illustrated. Two additional species are transferred to the genus, *E. morthieri* and *E. diaphanum*.

Several pyrenomycetous taxa occurring in decorticated wood, often becoming raised above the wood surface as fibers weather away, pose a problem in taxonomic position and relationship. Sherwood (1981) has discussed some of the problems in classification of small discomycetous taxa in a similar habitat. The fungi discussed here may present obviously unitunicate asci that blue in iodine or apparently bitunicate asci without reaction to the thickened apex. In both cases the asci elongate as ascospores mature and finally open at the apex to release the ascospores, without extruding an endotunica. Aside from reaction to iodine, the taxa seem congeneric, although at least three genera have been described for them.

Exarmidium was described by Karsten in the "Dothideae" and based on *E. hysteriiforme* from northern Europe. Both Saccardo (1883) and Lindau (1897) considered *Exarmidium* to be synonymous with *Rhopographus* Fuckel in the Dothideaceae. Theissen and Sydow (1915) recognized *Exarmidium* as a genus in the Phyllachoraceae of the Dothideales. Müller and von Arx (1973) and Wehmeyer (1975) placed the genus in the Amphisphaeriaceae, Sphaeriales. Holm and Holm (1977) were uncertain of the true taxonomic position of *E. hysteriiforme* and included it among the Dothideaceae. In the 7th edition of Dictionary of the Fungi (Hawksworth et al., 1983), *Exarmidium* is retained in the Dothideales, without indication of family position.

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[1] Present address: The New York Botanical Garden, Bronx, New York 10458.

From our studies on North American specimens as well as a more superficial examination of European ones, we are convinced that *Exarmidium hysteriiforme* belongs in Class Ascomycetes; Barr has assigned it to the Physosporellaceae (= Hyponectriaceae) of the Phyllachorales (Barr, 1976, 1977). This family includes taxa with thin-walled, asymmetric, hyaline or lightly pigmented ascospores. The apices of the oblong asci may or may not react in iodine, depending upon the species. The peridium of immersed ascomata is relatively soft and is composed of compressed rows of cells. Clypeal development or a thickened and darkened upper region of the peridium are typical features. The species in the family are saprobic or weakly parasitic. *Exarmidium* seems to be related to *Monographos* Fuckel (Holm and Holm, 1978), and to differ especially in ellipsoid-obovoid rather than narrowly fusoid ascospores as well as in habitat, *Exarmidium* in decorticated wood, *Monographos* in fern leaflets and petioles. *Exarmidium* also has many features in common with *Telimenella* Petrak (Barr,1977), especially in forming a clypeus over the ascomata. *Telimenella* develops in leaves of monocots. *Arwidssonia* B. Eriksson (1974),typified by *A. empetri* (Rehm) B. Eriksson, has similar asci and ascospores, but the ascomata are immersed in leaf tissues, lack a clypeus, and open by lobes.

Clypeothecium Petrak (in H. Sydow and Petrak, 1922) was erected for *C. weirii*, and was included at that time in the Sphaeriaceae. In 1923 Petrak compared *Clypeothecium* with *Melomastia* and thought both genera could be placed in the Pleosporaceae. However, *Melomastia* has unitunicate asci and is now disposed in the Amphisphaeriaceae. Still later, Petrak (1929) decided that *Clypeothecium* was not separable from *Exarmidium*. Shear (1942) concluded that *C. weirii* and *Trematosphaeria morthieri* Fuckel (as *Zignoella* subgenus *Trematostoma morthieri* (Fuckel) Saccardo, 1883) were identical. He proposed that *Trematostoma* be raised to the level of genus with the species designated as *Trematostoma morthieri* (Fuckel) Shear. We agree that *T. morthieri* and *C. weirii* refer to the same species, but *Clypeothecium* would be the earlier name for the genus. Neither *Clypeothecium* nor *Trematostoma* were disposed of by Müller and von Arx (1973) or Luttrell (1973). Wehmeyer (1975) placed *Clypeothecium* close to *Exarmidium* in the Amphisphaeriaceae. Von Arx and Müller (1975) decided that *Clypeothecium* was a synonym of

Massarina; Hawksworth et al. (1983) accepted that disposition. After considerable vacillation, we have determined that the asci of *Trematosphaeria morthieri* are indeed unitunicate and that inclusion in *Exarmidium* is the best position for the species, as Petrak (1929) had done long ago. There appear to be sufficient variations in several character states to allow recognition of two species in the "*morthieri*" complex, in addition to *E. hysteriiforme*.

Exarmidium Karsten, Mycol. Fenn. 2: 29. 1873.
Rhopographus subg. *Exarmidium* (Karsten) Sacc. Syll. Fung. 2: 648. 1883.
Clypeothecium Petrak in H. Sydow & Petrak, Ann. Mycol. 20: 182. 1922.
Trematostoma (Sacc.) Shear, Mycologia 34: 273. 1942.
Zignoella subg. *Trematostoma* Sacc. Syll. Fung. 2: 222. 1883.

Ascomata sphaeroid, single or several grouped beneath clypeus in fibers of decorticated wood, immersed and visible as low rounded or ellipsoid, dull black areas, becoming erumpent by weathering of surrounding wood, with rounded apex often somewhat sunken, opening by small pore in sunken area; clypeus composed of interwoven brown hyphae, peridium narrow, of several rows of yellowish or pallid ± compressed cells. Asci unitunicate, basal, oblong elongating to clavate or cylindric at maturity, wall firm throughout, thickened above, cytoplasm ± truncate with a poorly defined apical apparatus or with shallow refractive ring, the entire apical region as well as gel surrounding paraphyses either blued in iodine or not reacting. Paraphyses delicate, narrow, not or rarely branched, free ends extending into apical pore, in a gelatinous matrix. Ascospores hyaline or faintly yellowish, ellipsoid or obovoid, often inequilateral, tapered to obtuse ends, three or more transversely septate, occasionally with longitudinal septum in one or few cells, not or slightly constricted at primary septum; wall firm, smooth; contents guttulate; overlapping biseriate becoming uniseriate in the ascus.

In exposed decorticated woody tissues of coniferous and angiospermous plants, mostly subarctic or subalpine in distribution.

Type species: *E. hysteriiforme* (Karsten) Karsten

Key to Species

1. Ascomata several beneath clypeus; ascus apex and hymenium bluing in iodine; in conifer wood....... *E. hysteriiforme*
1. Ascomata single or rarely two or three beneath clypeus; ascus apex and hymenium not or rarely bluing in iodine..2
    2. In conifer wood; ascospores (15-)18-25(-30) x (4-)6-8(-11) µm, 3-4-5-septate................ *E. morthieri*
    2. In angiosperm wood; ascospores 12-18(-22) x (3-)4.5-7(-8) µm, 3-(4-5-)septate............... *E. diaphanum*

Exarmidium hysteriiforme (Karsten) Karsten, Mycol. Fenn. 2: 222. 1873. Figs. 1-4

Dothidea hysteriiformis Karsten, Not. Soc. Fauna Flora Fenn. 8: 213. 1866.

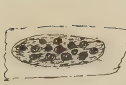
Rhopographus hysteriiforme (Karsten) Sacc. Syll. Fung. 2: 648. 1883.

Clypei elongate ellipsoid, dull black, 1-3 mm long, 0.5-1 mm wide; ascomata numerous beneath clypeus, sphaeroid, 110-200 µm diam; peridium hyaline, yellowish or light yellowish brown, up to 15 µm wide. Asci 45-65(-78) x (7.5-)10-12.5 µm, apex and gel surrounding paraphyses bluing in iodine. Ascospores 11-15(-18) x (4.5-)5-6(-8) µm, hyaline, ellipsoid, nearly symmetrical, 3-septate, not constricted at septa.

On decorticated wood of *Abies, Juniperus, Thuja,* Europe, North America.

Material examined: Europe: Sweden: Tärna, Umfors, 10 Sep 1961, L. Holm (UPS). USSR: Kitofka, Kola, Rasnavolok, P. A. Karsten (syntype, UPS). Switzerland: DAOM 89548, 89549 (DAOM). North America: British Columbia: Barr 118 (UBC). Idaho: Weir 16631, 16611 (BPI). Washington: Ellis N.A.F. 1281b (MASS); Mt. Paddo, Nov 1883, W. N. Suksdorf (NY).

Figs. 1-11. Species of *Exarmidium*. 1-4. *E. hysteriiforme*: 1. Habit sketch. 2. Ascomata under clypeus, in vertical section. 3. Asci, that on left stained in iodine. 4. Ascospores. 5-8. *E. morthieri*: 5. Habit sketch. 6. Three ascomata in vertical section, upper left from N.A.F. 1198, lower left from substitute for N.A.F. 571, right from type of *Clypeothecium weirii*. 7. Ascus. 8. Ascospores, showing variation in shape and septation. 9-11. *E. diaphanum*: 9. Ascomata in vertical section, above from Baker 441, below from N.A.F. 781. 10. Two asci, that on left discharging ascospores. 11. Ascospores showing variation. Standard line = 150 µm for ascomata, 15 µm for asci and ascospores.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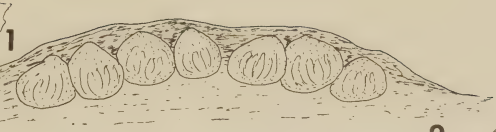
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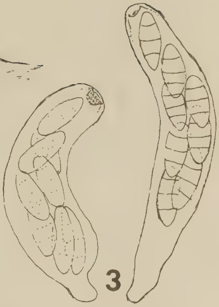
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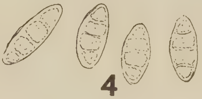
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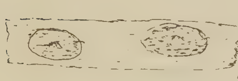
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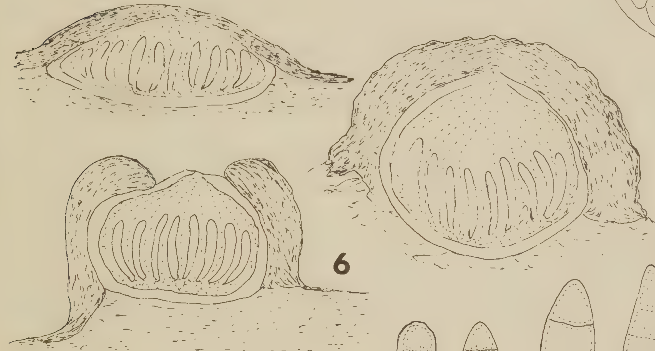
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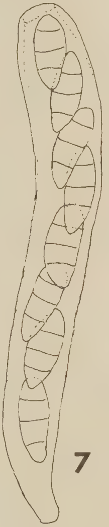
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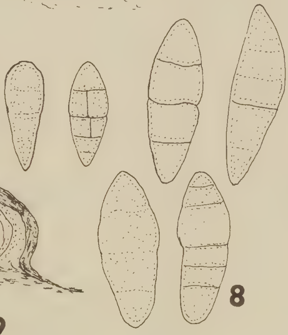
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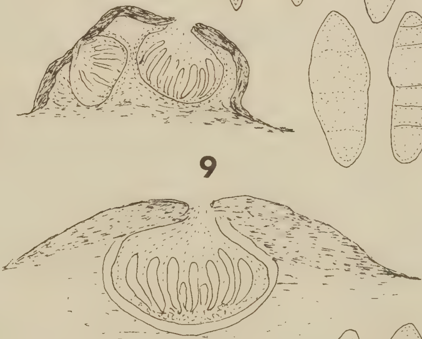
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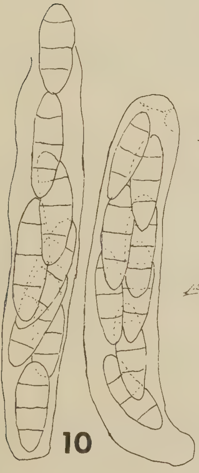
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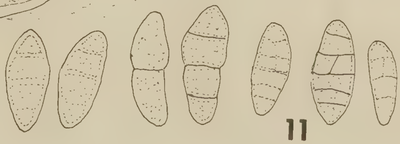
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Exarmidium morthieri (Fuckel) Barr & Boise, comb. nov.
Figs. 5-8

Trematosphaeria morthieri Fuckel, Jahrb. Nassauischen Vereins Naturk. 25/26: 306. 1871, for *T. picastra* Fuckel, 1870, non Fries.
Zignoella morthieri (Fuckel) Sacc. Michelia 1: 347. 1878.
Trematostoma morthieri (Fuckel) Shear, Mycologia 34: 273. 1942.
Massarina morthieri (Fuckel) von Arx & Müller, Stud. Mycol. Baarn 9: 77. 1975.
Leptosphaeria picastra Fuckel ex von Höhnel, Mitt. Bot. Inst. Techn. Hochsch. Wien 4: 44. 1927.
Sphaeria soluta Cooke & Ellis, Grevillea 5: 54. 1876.
Zignoella soluta (Cooke & Ellis) Sacc. Syll. Fung. 2: 216. 1883.
Sphaeria albocincta Cooke & Ellis, Grevillea 7: 9. 1878.
Zignoella albocincta (Cooke & Ellis) Sacc. Syll. Fung. 2: 224. 1883.
Conisphaeria (Zignoella) albocincta (Cooke & Ellis) Cooke, Grevillea 16: 88. 1888.
Zignoella diaphana (Cooke & Ellis) Sacc. var. *albocincta* (Cooke & Ellis) Ellis & Everh. North Amer. Pyrenomyc. 187. 1892.
Zignoella diaphana (Cooke & Ellis) Sacc. var. *soluta* (Cooke & Ellis) Ellis & Everh. North Amer. Pyrenomyc. 188. 1892.
Clypeothecium weirii Petrak, Ann. Mycol. 20: 183. 1922.
Exarmidium weirii (Petrak) Petrak, Ann. Mycol. 27: 401. 1929.

Ascomata single or occasionally two or three beneath clypeus, (200-)330-550 μm diam; peridium yellowish to pallid. Asci 80-120 x 14-15 μm, apex not usually bluing in iodine (although Shoemaker noted bluing in DAOM 111263). Ascospores (15-)18-25(-30) x (4-)6-8(-11) μm, hyaline to yellowish, ± obovoid, inequilateral, 3-4-5-septate, occasionally with longitudinal septum in one or two cells, slightly constricted at primary septum.

On decorticated wood of *Abies*, *Picea*, *Pinus*, *Thuja*, Europe, North America.

Material examined: Europe: Germany: Fuckel, Fungi rhenani 2447 (isotype of *T. morthieri*, FH); Herbier Barbey-Boissier 628 (NY); de Thümen, Mycotheca univ. 167 (NY); Rehm, Ascomyceten 87 (NY). Sweden: 1885, E. Haglund (UPS). Great Britain: IMI 37141 (CMI). North America: British Columbia: DAOM 111263 (DAOM). Massachusetts: Webber, sine loc., wood of pilings (MASS). New Jersey: Ellis N.A.F. 100

(isotype of *Sphaeria soluta*, NY); N.A.F. 1198 (isotype of *S. albocincta*, MASS, NY); Newfield (isotype of *S. albocincta*, NY). Wyoming: Big Horn Mts., 21 Aug 1898, Williams & Griffiths (BPI). Idaho: Herb. Weir 16638 (holotype of *Clypeothecium weirii*, BPI, DAOM); Weir 16610 (BPI); Clearwater, 8 Jun 1920, Rhoads s.n. (BPI). Colorado: Ellis substitute for N.A.F. 571 (MASS); San Juan Mts., Bethel 349 (NY). Oregon: Barr 6292 (MASS).

Exarmidium diaphanum (Cooke & Ellis) Barr & Boise, comb. nov. Figs. 9-11

Sphaeria diaphana Cooke & Ellis, Grevillea 5: 53. 1876.

Zignoella diaphana (Cooke & Ellis) Sacc. Syll. Fung. 2: 220. 1883.

Psilosphaeria diaphana (Cooke & Ellis) Cooke, Grevillea 16: 50. 1887.

? *Exarmidium ericae* Petrak, Ann. Mycol. 27: 400. 1929 (sec descr.)

Ascomata usually single or occasionally two or three beneath clypeus, 330-550 μm diam; peridium yellowish or pallid. Asci (40-)50-90 x 10-14 μm, not bluing in iodine. Ascospores 12-18(-22) x (3-)4.5-7(-8) μm, hyaline to yellowish, ± obovoid, inequilateral, 3-(4-5-)septate, occasionally with longitudinal septum in one or two cells.

On decorticated angiosperm wood and coarse herbaceous stems of *Amelanchier*, *Aplopappus*, *Astragalus*, *Lonicera*, *Phyllodoce*, *Platanus*, *Potentilla*, *Populus*, *Quercus*, *Salix*, North America.

Material examined: North America: Massachusetts: Barr 6635 (MASS). New Jersey: Ellis N.A.F. 781 (presumed isotype of *S. diaphana*, MASS, NY). British Columbia: Barr 131 (UBC). Montana: Sheridan, July 1894, Mrs. Fitch (NY, as unpubl. herb. name *Teichospora fusispora*). Colorado: Baker 441 (NY); Barr 6994, 7021 (MASS). Utah: Barr 6087b (MASS). Arizona: Barr 6783 (MASS). California: W. B. Cooke 42661, 42706a, 42812 (part in MASS).

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LICHENS OF THEODORE ROOSEVELT NATIONAL PARK

Clifford M. Wetmore

Botany Department, University of Minnesota, St. Paul, Minn.

SUMMARY

Based on extensive collecting in the park 204 species were found and are listed. Four new combinations are made: Aspicilia reptans (Looman) Wetm., Peccania subnigra (B. de Lesd.) Wetm., Peccania texana (Tuck.) Wetm., Staurothele monicae (Zahlbr.) Wetm. The flora includes numerous rare boreal lichens and many significant range extensions. Critical notes are given for some species.

INTRODUCTION

Theodore Roosevelt National Park is located in western North Dakota along the Little Missouri River. In this area the rolling prairies are dissected by deep erosional valleys with steep, often unvegetated slopes. The park is composed of three units at various points along the Little Missouri River. The North Unit contains about 147.6 square km (57 square miles) and is 88.5 km (55 miles) north of the South Unit which has 160.6 square km (62 square miles) of land. The Elkhorn Ranch Unit is approximately midway between the North and South Unit and has less than 1.3 square km (0.5 square miles) of land. The elevation of the park gradually slopes to the north and ranges from 853 meters (2800 ft.) on the plateaus of the South Unit to 579 meters (1900 ft.) in the valleys of the North Unit.

The general climate is semi-arid continental with an average annual precipitation of 35.5 mm (14 inches) and temperature ranging from -18 degrees C. (zero degrees F.) to above 38 degrees C. (100 degrees F.) with a mean July temperature of 21 degrees C. (70 degrees F.) and a mean January temperature of -11 degrees C. (12 degrees F.) The vegetation in the park is variable depending on slope and elevation. The plateaus are short grass prairie and the valley bottoms are floodplain forests of cottonwood (Populus deltoides Bartr.). On the steep north facing slopes are Juniperus scopulorum Sarg. with some american elm (Ulmus americana L.) and green ash (Fraxinus pennsylvanica var. lanceolata (Borkh.) Sarg.). The steep south facing slopes are generally bare except for scattered clumps of grasses. Sagebrush (Artemisia sp.) occurs on some of the gentler slopes and dry riverbottoms. Many of the juniper forests have been selectively logged in the past for fence posts and most of these areas have been burned. The numerous juniper stumps in these areas provide unique habitats for lichens.

Very little lichen collecting has been done in the park prior to this study. In 1959 a brief study was done by Ralph L. Dix who collected in the North and South Units of the park. The lichens were identified by Dr. John Thomson and the specimens are in the University of Wisconsin herbarium but no report was published. Recently Dr. Theodore Esslinger (at times with his students) has collected in the park and the specimens are in the North Dakota State University Herbarium. Only a few collections by these workers have been cited in the literature (Sierk, 1964; Ahti, 1966; Sheard, 1974; Esslinger, 1979). Prior to the present study only four species had been recorded for the park.

METHODS

In July, 1982 I spent three weeks collecting lichens in all units of the park. Over 1450 collections were made at 39 localities: 20 in the North Unit, 19 in the South Unit, 2 in the Elkhorn Ranch Unit. Localities for collecting were selected first to give a general coverage of the park unit, second, to sample all vegetational types, third, to be in localities that should be rich in lichens. At each locality voucher specimens of all species found were collected to record the total flora for each locality and to avoid missing different species that might appear similar in the field.

Identifications were carried out at the University of Minnesota and critical specimens in Thomson's herbarium were also checked. The original packet of each collection has been deposited in the University of Minnesota Herbarium with a representative set of duplicates sent to the park, to the herbarium of North Dakota State University and to the Smithsonian Institution. All specimens deposited at the University of Minnesota have been entered into the computerized data base maintained there. Lists of localities where collections were made and lists of species found at each locality are available from this data base at any time on request.

The park personnel have been very helpful during the field work which has contributed significantly to the success of the project. The study was made possible by funds from the Theodore Roosevelt Nature and History Association and the National Park Service. The contributions of all of these are gratefully acknowledged.

LICHEN FLORA

The following list of 204 lichen taxa is based on my collections and those reported in the literature. In addition to the species listed there are about 20 unidentified species. The first column indicates in which of the three park units the species was found: N=North Unit, S=South Unit, E=Elkhorn Ranch Unit.

Park Unit	Species
NS	*Acarospora americana* Magn.
NSE	*Acarospora cinereoalba* (Fink) Magn. The thallus is heavily pruinose but brown when wet. The areoles are not deeply cracked as in *A. strigata* and *A. cinereoalba* is more heavily pruinose than *A. americana*. Collected on soft sandstone.
NS	*Acarospora fuscata* (Schrad.) Arn.
N	*Acarospora reagens* Zahlbr. The thallus is squamulose and closely appressed with thick white pruina and attached to substrate with a thick root-like rhizine. The thallus reacts K+ rusty red (norstictic acid). Compared with topotype material determined by Zahlbruckner in MIN. Rare on soil.
NS	*Acarospora schleicheri* (Ach.) Mass.
NS	*Agrestia hispida* (Meresch.) Hale & W. Culb.
NS	*Arthonia intexta* Almqu.
S	*Arthonia lapidicola* (Tayl.) Branth & Rostr.
NS	*Aspicilia alphoplaca* (Ach.) Poelt & Leuck.
S	*Aspicilia caesiocinerea* (Nyl. ex Malbr.) Arn.
NS	*Aspicilia cinerea* (L.) Körb.
NS	*Aspicilia contorta* (Hoffm.) Kremp.
NS	*Aspicilia reptans* (Looman) comb. nov. *Lecanora* (Aspicilia) *reptans* Looman. Bryologist 65:301. 1962. This species is similar to *A. desertorum* and *Agrestia hispida* but has no pseudocyphellae as in the latter species while the more squamulose terricolous thallus of *A. reptans* separates it from the former species. The apothecia are rare but the conidia are filiform as is characteristic of other members of this genus.
NS	*Bacidia bacillifera* (Nyl.) Fink
NS	*Bacidia bagliettoana* (Mass. & De Not.) Jatta
N	*Bacidia populorum* (Mass.) Trev.
NSE	*Bacidia sabuletorum* (Schreb.) Lett.
S	*Bryoria capillaris* (Ach.) Brodo & Hawksw. Found once on a juniper stump and a considerable range extension in central North America.
NS	*Bryoria fuscescens* (Gyeln.) Brodo & Hawksw. Not uncommon on juniper stumps.
NS	*Buellia elegans* Poelt
NS	*Buellia punctata* (Hoffm.) Mass.
N	*Buellia retrovertens* Tuck. This has a grayish white thallus that is often pruinose and lacks a prothallus. Collected once on rock. A species more common in southwesten North America.
NSE	*Buellia venusta* (Körb.) Lett.
S	*Buellia zahlbruckneri* J. Stein.
S	*Caloplaca atroalba* (Tuck.) Zahlbr.
NSE	*Caloplaca cerina* (Ehrh.) Th. Fr.
NS	*Caloplaca chrysophthalma* Degel.
S	*Caloplaca citrina* (Hoffm.) Th. Fr.
NSE	*Caloplaca decipiens* (Arn.) J. Stein.
NSE	*Caloplaca feracissima* Magn.
NSE	*Caloplaca flavorubescens* (Huds.) Laund.

NSE *Caloplaca holocarpa* (Hoffm.) Wade

NS *Caloplaca lobulata* (Flörke) Hellb.

NSE *Caloplaca microphyllina* (Tuck.) Hasse

NS *Caloplaca sarcopisoides* (Körb.) Zahlbr. This corticolous species has been overlooked in North America but is quite common in Minnesota and in this park. The thallus is thin and gray-green, apothecia flat to slightly convex, margin brown to tan with brown to dark brown disk, with algae in the base but none in the margin. The epithecium and thallus are K-, spores polarilocular, 9-12 x 5.7 um, isthmus 4.5-7 um. It is similar to *C. camptidia* but *C. sarcopisoides* is not pruinose and has smaller spores. Compared with Vezda Lich. Sel. Exs. 595 (US).

S *Caloplaca saxicola* (Hoffm.) Nordin

S *Caloplaca squamosa* B. de Lesd. This species has short, overlapping, squamulose lobes uplifted from the substrate, no radiating lobes like *C. saxicola*, and has a good paraplectenchymatous apothecial cortex and layer under the hymenium. *C. lobulata* lacks these cellular parts according to European material I have seen. This occurs on non-calcareous rocks.

N *Caloplaca stillicidiorum* (Vahl) Lynge

NS *Caloplaca tominii* Savicz

NS *Caloplaca trachyphylla* (Tuck.) Zahlbr.

NS *Caloplaca ulmorum* (Fink) Fink

NSE *Candelaria concolor* (Dicks.) B. Stein

NSE *Candelariella aurella* (Hoffm.) Zahlbr.

NSE *Candelariella deflexa* (Nyl.) Zahlbr.

N *Candelariella efflorescens* Harris & Buck

NSE *Candelariella subdeflexa* (Nyl.) Lett.

NSE *Candelariella vitellina* (Ehrh.) Müll. Arg.

S *Candelariella xanthostigma* (Ach.) Lett.

NSE *Catillaria nigroclavata* (Nyl.) Schul.

NS *Cetraria halei* W. Culb. & C. Culb.

NS *Cetraria pinastri* (Scop.) S. Gray Found several times but always as small scraps on juniper stumps and logs.

N *Cladina mitis* (Sandst.) Hale & W. Culb. Found at a few localities but always very small.

N *Cladina rangiferina* (L.) Harm. Rare and small.

S *Cladonia acuminata* (Ach.) Norrl.

NS *Cladonia bacillaris* (Ach.) Nyl.

NS *Cladonia chlorophaea* (Flörke ex Somm.) Spreng.

S *Cladonia coniocraea* (Flörke) Spreng.

NS *Cladonia cornuta* (L.) Hoffm.

S *Cladonia cristatella* Tuck. Found once on a juniper stump and an important western range extension for the northern plains.

N *Cladonia decorticata* (Flörke) Spreng.

NS *Cladonia fimbriata* (L.) Fr.

NS *Cladonia gracilis* (L.) Willd.

N *Cladonia humilis* (With.) Laundon This species was formerly known as *C. conista*

NSE *Cladonia pyxidata* (L.) Hoffm.

N *Cladonia robbinsii* Evans

NS *Cladonia subulata* (L.) Wigg.

NSE *Cladonia symphycarpa* (Ach.) Fr.

N *Collema coccophorum* Tuck.

NS *Collema conglomeratum* Hoffm.
SE *Collema furfuraceum* (Arn.) Du Reitz
S *Collema fuscovirens* (With.) Laundon Formerly known as *C. tuniforme*.
NS *Collema tenax* (Sw.) Ach.
E *Coniocybe pallida* (Pers.) Fr. Found once on a leaning ash.
NSE *Cyphelium notarisii* (Tul.) Blomb. & Forss.
NSE *Dermatocarpon lachneum* (Ach.) A. L. Sm.
NS *Dermatocarpon miniatum* (L.) Mann
S *Dermatocarpon moulinsii* (Mont.) Zahlbr.
NSE *Dermatocarpon plumbeum* (B. de Lesd.) Zahlbr.
S *Dermatocarpon tuckermanii* (Rav.) Zahlbr.
NS *Dimelaena oreina* (Ach.) Norm.: Also reported by Sheard (1974)
NS *Diploschistes actinostomus* (Pers.) Zahlbr.
NSE *Diploschistes scruposus* (Schreb.) Norm.
NSE *Endocarpon pusillum* Hedw.
NSE *Evernia mesomorpha* Nyl.
NSE *Fulgensia bracteata* (Hoffm.) Räs.
NSE *Fulgensia fulgens* (Sw.) Elenk.
NS *Heppia lutosa* (Ach.) Nyl.
NSE *Hyperphyscia adglutinata* (Flörke) Mayrh. & Poelt
NS *Hypogymnia physodes* (L.) W. Wats.
S *Hypogymnia tubulosa* (Schaer.) Hav.
SE *Lecania erysibe* (Ach.) Mudd
NS *Lecania fuscella* (Schaer.) Körb.
NSE *Lecanora chlarotera* Nyl.
NS *Lecanora dispersa* (Pers.) Somm.
NS *Lecanora frustulosa* (Dicks.) Ach.
S *Lecanora garovaglii* (Körb.) Zahlbr.
NS *Lecanora hageni* (Ach.) Ach.
NSE *Lecanora impudens* Degel.
NS *Lecanora muralis* (Schreb.) Rabenh.
N *Lecanora piniperda* Körb.
S *Lecanora rupicola* (L.) Zahlbr.
SE *Lecanora saligna* (Schrad.) Zahlbr.
N *Lecidea atrobrunnea* (Ram.) Schaer.
N *Lecidea berengeriana* (Mass.) Nyl.
NS *Lecidea cerebriformis* W. Web.
NS *Lecidea decipiens* (Hedw.) Ach.
NSE *Lecidea globifera* Ach.
NS *Lecidea granulosa* (Ehrh.) Ach.
N *Lecidea luridella* Tuck.
N *Lecidea plana* Lahm ex Körb.
S *Lecidea russellii* Tuck.
NS *Lecidea tessellata* (Ach.) Flörke
S *Lecidea xanthococca* Somm.
N *Lecidella carpathica* Körb.
NSE *Lecidella euphorea* (Flörke) Hert.
S *Lecidella inamoena* (Müll. Arg.) Hert. This species belongs in the *stigmatea* group and differs in having an inspersed hymenium and almost no thallus. *L. stigmatea* has a thick thallus and no oil droplets in the hymenium. *L. spitsbergensis* has a thick thallus and a hymenium with very small oil droplets.
NSE *Lecidella spitsbergensis* (Lynge) Hert. & Leuck.

NS *Lecidella stigmatea* (Ach.) Hert. & Leuck.
NS *Lepraria finkii* (B. de Lesd. in Hue) ined.
[*Leptogium amphineum* Nyl.: Reported by Sierk (1964), based on a misidentification = *Collema coccophorum*]
N *Leptogium minutissimum* (Flörke) Fr.
N *Leptogium tenuissimum* (Dicks.) Fr.
S *Micarea globularis* (Nyl.) Hedl.
S *Mycocalicium parietinum* (Ach. ex Schaer.) Hawksw.
S *Ochrolechia arborea* (Ljubitz.) Almb.
NS *Pachyospora mutabilis* (Ach.) Mass.
N E *Parmelia albertana* Ahti
NS *Parmelia caperata* (L.) Ach.
NS *Parmelia chlorochroa* Tuck.
N *Parmelia conspersa* (Ach.) Ach.
NS *Parmelia flaventior* Stirt.
N *Parmelia lineola* Berry
NS *Parmelia mexicana* Gyeln.
S *Parmelia plittii* Gyeln.
NSE *Parmelia soredica* Nyl.
N *Parmelia somediosa* Almb.
NSE *Parmelia subargentifera* Nyl.
N *Parmelia subaurifera* Nyl.
NSE *Parmelia subolivacea* Nyl. in Hasse: Also reported by Ahti (1966)
N E *Parmelia substygia* Räs.
NSE *Parmelia sulcata* Tayl.
NS *Parmelia taractica* Kremp.
N *Peccania subnigra* (B. de Lesd.) comb. nov. *Placynthium subnigrum* B. de Lesd. Ann. Crypt. Exot. 5:114. 1932. Thallus black with coralloid upright cylindrical lobes with tips of lobes slightly swollen, 87-175mu, not polster-forming. The lobes are smaller than in *Peccania texana* (Tuck.) comb. nov. (*Synalissa texana* Tuck. Gen. Lich. 80. 1872) and *P. arizonica* is polster-forming. All of these species lack the red color in the algal sheath so characteristic of *Synalissa*. All species compared with the types (FH). Found only once on soil.
S *Peltigera canina* (L.) Willd.
N *Peltigera neckeri* Müll. Arg.
N *Peltigera praetextata* (Flörke in Somm.) Zopf
NSE *Peltigera rufescens* (Weiss) Humb.
S *Peltula bolanderi* (Ach.) Wetm.
NS *Peltula polyspora* (Tuck.) Wetm.
NS *Pertusaria saximontana* Wetm.
NSE *Phaeophyscia cernohorskyi* (Nadv.) Essl.
NSE *Phaeophyscia chloantha* (Ach.) Moberg
NS *Phaeophyscia constipata* (Norrl. et Nyl.) Moberg
NS *Phaeophyscia hirsuta* (Meresch.) Essl.
S *Phaeophyscia kairamoi* (Vain.) Moberg
NS *Phaeophyscia melanchra* (Hue) Hale
NSE *Phaeophyscia nigricans* (Flörke) Moberg
NS *Phaeophyscia orbicularis* (Neck.) Moberg
NS *Phaeorrhiza sareptana* (Tomin) Mayrh. & Poelt Similar to *Rinodina nimbosa* but that has flat apothecia. Like *R. sphaerocarpa* but that is restricted to the mountains and has larger spores according to Sheard (pers. comm.). This species grows on soil and has a lobed-squamulose,

yellowish-green thallus with raised, convex apothecia. Det. Sheard.
NSE *Physcia adscendens* (Th. Fr.) Oliv.
N *Physcia aipolia* (Ehrh.) Hampe
SE *Physcia biziana* (Mass.) Zahlbr.
NS *Physcia caesia* (Hoffm.) Hampe
NSE *Physcia dimidiata* (Arn.) Nyl.: Also reported by Esslinger (1979)
NS *Physcia dubia* (Hoffm.) Lett.
NS *Physcia stellaris* (L.) Nyl.
N E *Physcia subtilis* Degel.
NSE *Physconia detersa* (Nyl.) Poelt
NSE *Physconia muscigena* (Ach.) Poelt
N *Placynthiella icmalea* (Ach.) Coppins & P. James Formerly called *Lecidea uliginosa* but most of the material in North America under this name has a C+ reaction in the thallus. Found once in the park.
NSE *Placynthium nigrum* (Huds.) S. Gray
S *Protoblastenia rupestris* (Scop.) J. Stein.
N *Ramalina sinensis* Jatta Collected once but with the characteristic broad lobes and curved spores.
NS *Rhizocarpon disporum* (Naeg. ex Hepp) Müll. Arg.
NS *Rhizoplaca chrysoleuca* (Smith) Zopf
NS *Rhizoplaca melanophthalma* (Ram.) Leuck. & Poelt
SE *Rinodina bischoffii* (Hepp) Mass.
S *Rinodina calcigena* (Th. Fr.) Lynge
NS *Rinodina colobina* (Ach.) Th. Fr.
S *Rinodina lobulata* Sheard ined. Det. Sheard.
N E *Rinodina mucronatula* Magn. On *Selaginella*, det. Sheard.
NS *Rinodina pyrina* (Ach.) Arn.
E *Rinodina riparia* Sheard ined. Det. Sheard.
S *Rinodina rivula* Sheard ined. Det. Sheard.
N *Rinodina zwachiana* (Kremp.) Körb. Det. Sheard.
N *Sarcogyne clavus* (Ram.) Kremp.
N E *Sarcogyne regularis* Körb.
SE *Sarcogyne simplex* Magn.
NSE *Squamarina lentigera* (G. Web.) Poelt
NS *Staurothele clopima* (Wahlenb. ex Ach.) Th. Fr.
N *Staurothele monicae* (Zahlbr.) comb. nov. *Endocarpon monicae* Zahlbr. Bot. Centralblatt Beih. 13:153. 1902. Black or rarely dark brown perithecia half immersed in areoles but thallus not depressed around perithecia as in *S. clopima* but ascending around perithecia; wall of perithecia hyaline at base. Collected twice on calcareous rock.
NS *Staurothele rufa* (Mass.) Zsch.
S *Thyrea nigritella* Lett.
NSE *Toninia caeruleonigricans* (Lightf.) Th. Fr.
S *Toninia tristis* (Th. Fr.) Th. Fr.
N *Umbilicaria muehlenbergii* (Ach.) Tuck.
NS *Usnea fulvoreagens* (Räs.) Räs.
NSE *Usnea hirta* (L.) Wigg.
NS *Usnea subfloridana* Stirt. The Usneas in the park are all small and not common.
NSE *Verrucaria muralis* Ach.
N *Verrucaria virens* Nyl.
NSE *Xanthoria elegans* (Link) Th. Fr.

NSE *Xanthoria fallax* (Hepp) Arn.
NSE *Xanthoria polycarpa* (Ehrh.) Oliv.
NSE *Xylographa abietina* (Pers.) Zahlbr.

DISCUSSION OF LICHEN FLORA

There are 204 species in the lichen flora of the park which is fairly diverse for such an apparently dry area. This diversity appears to be due primarily to the more moist habitats on north facing slopes in the juniper stands and due to the different types of rocks available. Most of the species in the juniper stands have boreal affinities and many of these are near their southern limits of distribution in the park and as a result have small thalli and are infrequent in any one locality. The second major group are the plains and foothills lichens which are found on erosion slopes and prairies. This group is common in the park and often produce luxuriant thalli on the soil and calcareous rocks. A third smaller group occurs on acid rocks of the petrified trees. This group is more common along the foothills of the Rocky Mountains south to Arizona and New Mexico.

The North and South Units of the park have similar lichen floras. Thirty-four of the 161 species in the North Unit were not found in either of the other units, 34 of the 161 species in the South Unit were not found in either of the other units and two of the 65 species in the Elkhorn Ranch Unit were not found in either other unit. The Elkhorn Ranch Unit is really not comparable because of its smaller size and limited habitat types. The differences in floras are probably due to chance collection of the rare species and due to the geographical position of the two units. *Cladina mitis* and *Cladina rangiferina* occur only in the North Unit but these northern species probably only reflect the same ecological conditions seen in the vascular plants in the two areas. Most of the lichens restricted to one unit of the park are rare because of habitat requirements and many of these rare lichens have boreal affinities.

The lichen flora of the park is similar to that of Turtle Mountains in north central North Dakota (Disrud & Trana, 1974). More recent collections by Trana from the Souris River Basin in central North Dakota have been only partially identified but information available from these collections in the University of Minnesota Herbarium indicate that in comparable habitats the lichen floras are very similar. Collections made by Dix were studied and there are no species found by him that were not found in the present study.

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SPOROTRICHUM SULPHUREUM, POSSIBLY AN OLDER NAME FOR PACHYSOLEN TANNOPHILUS

J.A. von Arx

Centraalbureau voor Schimmelcultures, Baarn,The Netherlands

Pachysolen tannophilus Boidin & Adzet is one of the few yeasts which can be recognized on the natural substrate from a dried specimen. It forms filamentous, narrowly cylindrical, thick-walled, refractive ascophores which produce apically an ascus containing 2 to 4 small, hemispherical ascospores. The colonies are mucoid and the ellipsoidal or short cylindrical cells occasionally form pseudohyphae.

Similar structures were found on slides received from Dr. J.A. Stalpers and prepared from the type specimen of *Sporotrichum sulphureum* Grev. (PC). The specimen was collected on a wine cask (vasis viniformis) in Great Britain. The slides have previously been studied by Dr. C.A.N. van Oorschot, and Stalpers (Stud. Mycol. 24: 87. 1984) proposed the new combination *Arthrographis sulphurea* (Grev.) Stalpers & van Oorschot. These authors considered *S. sulphureum* an earlier name of *Arthrographis kalrai* (Tewari & Macpherson) Sigler & Carmichael, a very different hyphomycetous dermatophyte, isolated from man or from soil and dung in mainly tropical areas. In the same year, van Oorschot & de Hoog (Mycotaxon 20: 132. 1984 identified *S. sulphureum* with *Oospora cuboidea* Sacc. & Ellis = *Coremiella cuboidea* (Sacc. & Ellis) Ciferri & Caretta = *Arthrographis cuboidea* (Sacc. & Ellis) Sigler, again a different fungus with expanding colonies.

In the type specimen of *Sporotrichum sulphureum* supplementary ellipsoidal or oblate cells are present, some of which are brown. These may belong to another organism. Most of the structures are morphologically similar to *Pachysolen tannophilus,* but no new combination in *Pachysolen* is proposed. The identity of *S. sulphureum* and *P. tannophilus* cannot be demonstrated and may be questioned. The latter species ferments glucose and shows peculiar physiological properties, data which are unknown for *S. sulphureum.*

Without doubt several yeasts recently described from pure culture will have earlier names in "old" genera such as *Monilia, Oospora* and *Torula.* Dried type specimens may be available. Their revision, however, would not be worth the trouble. New names in yeasts based on such specimens in any case would not promote nomenclatural stability. I continue to believe that dried specimens are seldom appropriate as type material and that the Code of Nomenclature needs to be amended to provide for living type cultures of yeasts and certain other fungi.

The author thanks Dr. J.A. Stalpers for supplying slides of the above discussed yeast and Dr. K.A. Seifert for useful comments.

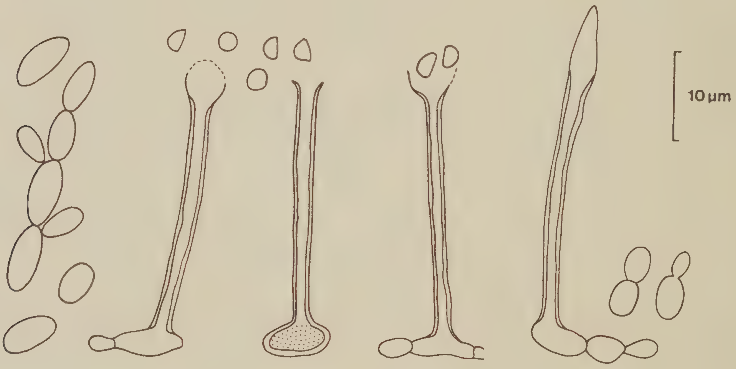

Fig. 1. *Sporotrichum sulphureum*, from the type (PC).

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TRICHURUS DENDROCEPHALUS SP. NOV., FROM IRAQI SOIL

Shun-ichi UDAGAWA[1], Yoshikazu HORIE[2]

and

Samir K. ABDULLAH[3]

[1] *National Institute of Hygienic Sciences, Kamiyoga 1-chome, Setagaya-ku, Tokyo 158, Japan*
[2] *Research Institute for Chemobiodynamics, Chiba University, Inohana 1-chome, Chiba-shi, Chiba 280, Japan*
[3] *Department of Biology, College of Science, University of Basrah, Basrah, Iraq*

SUMMARY

Trichurus dendrocephalus Udagawa, Horie et Abdullah, a new species isolated from cultivated soil is described and illustrated. Characteristics of the new species are compared with those of four other species of *Trichurus*.

During a floral survey of soil samples taken from a date palm plantation at the vicinity of Basrah City, Iraq, a number of interesting microfungi were isolated. One was a *Trichurus* species distinguished easily from all recognized taxa by its seta characteristics. We therefore propose a new species, *Trichurus dendrocephalus*, to accommodate this hyphomycete.

Trichurus dendrocephalus Udagawa, Horie et Abdulla, sp. nov. (Figs. 1-5)

Coloniae in agaro 'potato-carrot' modice effusae, tenues, floccosae vel fasciculatae, ex synnematibus numerosis et arcte contiguis compositae, atrovirentes vel viridi-griseae; reversum viridi-griseum.

Mycelium parte superficiale sed vulgo immersum, ex hyphis ramosis, septatis, subhyalinis vel dilute flavobrunneis, levibus, 1-3 µm crassis, tenuibus compositum. Conidiophora macronemata, synnemata. Synnemata gracilia, 1-2 mm alta, 8-40 µm crassa, erecta, simplicia vel interdum ramosa, atrobrunnea vel fere nigra, singularia vel in catervis parvis aggregata; capitula conidiorum plus minusve cylindracea, 160-450 × 160-280 µm (cum setis); stipes ex hyphis numerosis, olivaceo-brunneis, rectis vel aliquot flexuosis, levibus, incrassatis, septatis, terminaliter ramosis, 2-3 µm crassis, una aggregatis compositus; rami ultimi synnematis effusi, cellulas conidiogenas et setas formantes. Setae valde olivaceo-brunneae vel atrobrunneae, plerumque dichotome 2-3-ramosae, sinuolatae, leves, 40-100 µm longae, prope basim 3-4(-6) µm crassae, septatae, apicem versus gradatim contractae et pallescentes, ad basim cum cellulis conidiogenis praeditae. Metulae interdum producentes, 2-4 gregariae, 5-7 × 2.5-3 µm. Cellulae conidiogenae (annellides) usque 4(-6) per verticillum, ampulliformes vel brevi-cylindraceae, 4-6(-8) × 2-3 µm, tenues, cum zona annellata aliquanter angustiore(ab 'SEM'). Conidia sicca, unicellularia, catenata, dilute brunnea, ellipsoidea, ovoidea vel obovoidea, 2.5-6(-7) × 2-4 µm, basi truncata, ad apicem rotundata vel parum acuta, levia, plus minusve incrassata.

Holotypus: cultura NHL 2927 ex solo sativo, 'Basrah, Iraq,' in vii.1983, a S. K. Abdullah isolata. In collectione fungorum 'National Institute of Hygienic Sciences (NHL), Tokyo, Japan'.

Etymology: Lat. *dendro-* = tree- and *-cephalus* = -headed, referring to its setae morphology.

Colonies on potato-carrot agar growing moderately, attaining 26-27 mm diam. in 10 days at 23°C, consisting of a thin basal felt, floccose to fasciculate, with numerous closely packed synnemata, Olivaceous Grey to Iron Grey (Rayner, 1970), or dark green to greenish gray (Methuen 27F3-2, Kornerup and Wanscher, 1978); reverse Smoke Grey to Olivaceous Grey (Rayner), or greenish gray (Methuen 28E2).

Mycelium partly superficial but mostly immersed, composed of branched, septate, subhyaline to pale yellowish brown, smooth-walled, 1-3 µm diam., delicate hyphae, often forming a fascicle. Conidiophores macronematous, synnematous. Synnemata slender, 1-2 mm long, 8-40 µm wide, erect, simple or sometimes branched, dark brown to nearly black, arising singly or in small groups from rhizoid-like, radiate hyphae, with a well developed stipe and more or less cylindrical sporulating portion measuring 160-450 × 160-280

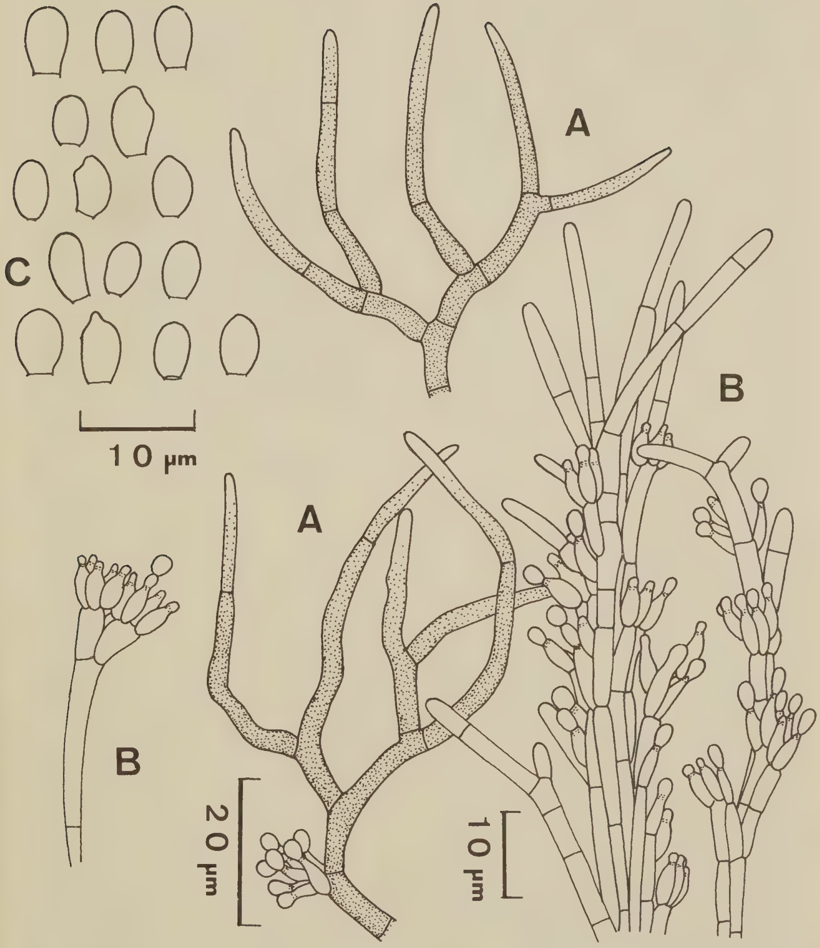
A
C
10 µm
B
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Fig. 1. *Trichurus dendrocephalus.*
A. Setae, with or without conidiogenous cells. B. Early stages of seta and conidiogenous cell development. C. Conidia.

µm (including setae); stipe composed of numerous, olive-brown, straight or somewhat flexuous, smooth, thick-walled, septate, terminally branched, 2-3 µm diam. hyphae which aggregate closely together; the ultimate synnematal branches splaying out to form conidiogenous cells and setae. Setae dark olive-brown to dark brown, simple or more usually 2-3 times branched dichotomously, faintly sinuous, smooth, 40-100 µm long, 3-4(-6) µm wide near the base, septate, tapering gradually to a hyaline and rounded tip, bearing a penicillate group of conidiogenous cells at the base. Metulae sometimes produced, 2-4 in the verticil, 5-7 × 2.5-3 µm. Conidiogenous cells (annellides) up to 4(-6) in the verticil, ampulliform to short-cylindrical, 4-6(-8) × 2-3 µm, thin, bearing a slightly narrower annellated zone (seen under SEM). Conidia dry, one-celled, in chains, pale brown, ellipsoid, ovoid or obovoid, 2.5-6(-7) × 2-4 µm, with a truncate base and rounded or slightly pointed apex, smooth, more or less thick-walled.

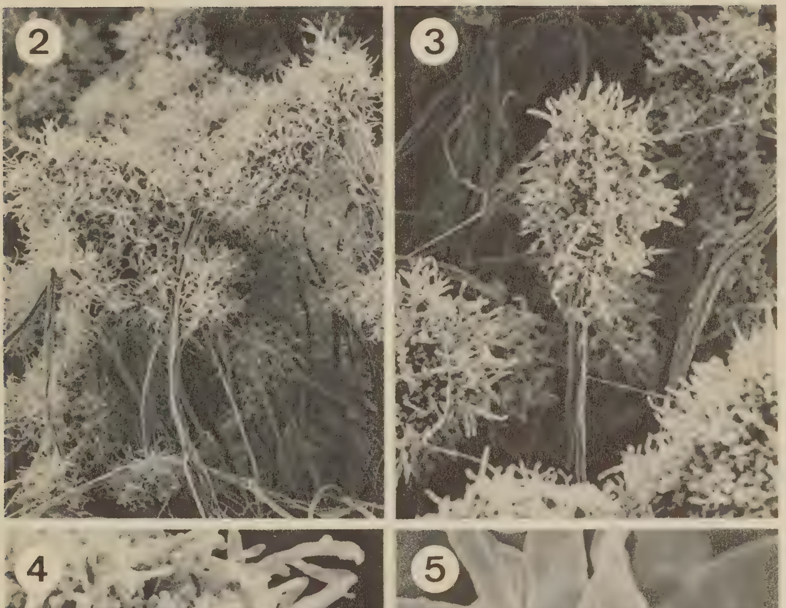
Colonies on oat-meal agar as described above except conidial areas quickly becoming dark, Olivaceous Black to Iron Grey (Rayner) or turquoise gray to dark turquoise (Methuen 24F2-3), with synnemata more abundant, more or less powdery.

At 37°C, slight growth but no production of conidia.

Isolation: In culture from cultivated soil at date palm plantation, near Basrah, Iraq, July 1983, isolated by S. K. Abdullah, NHL 2927 (holotype).

The genus *Trichurus* was established by Clements and Shear (1896, cf. Hasselbring, 1900) to accommodate a *Doratomyces*-like hyphomycete possessing sterile setae in the sporiferous head. From his study on the synnematal development in *Trichurus* spp., Swart (1964) considered the genus in relation to *Doratomyces* noting that the separation of both genera may not be a natural one. He did not, however, apply this conclusion to make positive transfers. After that, Ellis (1971), Carmichael et al. (1980) and von Arx (1981) yet treated *Trichurus* as being distinctive from *Doratomyces*.

Trichurus cylindricus was the type species, an obviously rare fungus (Domsch et al., 1980). As far as we are aware, only one strain of *T. cylindricus* has been preserved among the world culture collections, which was originally isolated from seed of *Sorghum* sp., Kansas, U. S. A. in 1955 and has been maintained at the Commonwealth Mycological Institute in England as CMI 96753. Other species described since the first one are: *T. spiralis* Hasselburg (1900); *T. gorgonifer* Bainier (1907); and *T. terrophilus* Swift et



Figs. 2-5. *Trichurus dendrocephalus*. 2, 3. Synnemata. SEM, ×75 and ×125. 4. Detail of ultimate synnematal branches, showing setae. SEM, ×750. 5. Detail showing annellated portion of conidiogenous cells. SEM, ×4000.

Povah (Swift, 1929). *Trichurus spiralis* appears to be most common. It is widespread in tropical, subtropical and temperate regions where it occurs as a saprophyte in soil, rhizosphere of cultivated plants, compost beds, seed of *Vaccinium* sp., rotten potatoes, sweet potato, peanuts, decaying wood, wood of cooling towers, sticks exposed to river water, and animal dung (Lodha, 1963; Yokoyama, 1969; Matsushima, 1975; Shoemaker and Kokko, 1977; Domsch et al., 1980). *Trichurus gorgonifer* has, according to Bainier's description (1907), straight to undulate setae and grayish conidia, but these are fundamentally similar to those of *T. spiralis*. Domsch et al. (1980) placed it in synonymy with *T. spiralis*.

Thus, at present there are four species in the genus *Trichurus*. They can be distinguished as follows:

1. Sterile setae once or twice coiled, rarely undulate, unbranched; conidia ovoid to lemon-shaped, (4-)4.5-5 (-6) × (2.5-)3-3.5(-4) µm .... *T. spiralis*
1. Sterile setae not coiled, unbranched or branched ... 2
2. Sterile setae sinuous, usually 2-3 times dichotomously branched, thick, 3-4(-6) µm near base; conidia ellipsoid to ovoid or obovoid, 2.5-6(-7) × 2-4 µm .... *T. dendrocephalus*
2. Sterile setae straight, unbranched or forked, slender, up to 3 µm near base 3
3. Sterile setae usually unbranched; conidia 8-9 × 3 µm (4-8 × 2.5-3.5 µm in CMI No. 96753)..*T. cylindricus*
3. Sterile setae usually forked; conidia ovoid to ellipsoid, 3-6 × 2-3.5 µm .... *T. terrophilus*

ACKNOWLEDGMENTS

We gratefully acknowledge Dr. S. C. Jong, American Type Culture Collection, for reviewing the manuscript and providing useful suggestions, Dr. Y. Otani for preparing the Latin description, and Dr. A. H. S. Onions for providing the cultures of *Trichurus cylindricus* and *T. terrophilus*. This study was supported in part by a grant from The Matsumae International Foundation to SKA.

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Actinomucor taiwanensis sp. nov., for Manufacture of Fermented Soybean Food

Shung-Chang Jong and Gwo-Fang Yuan*

Mycology & Botany Department, American Type Culture Collection
12301 Parklawn Drive, Rockville, Maryland 20852

Summary

Actinomucor taiwanensis sp. nov., is described and illustrated from a starter culture used in manufacture of sufu which is a well-known fermented food consumed widely in the Orient.

Actinomucor Schostakowitsh with A. elegans (Eidam) Benjamin et Hesseltine as the type is a monotypic genus of the family Mucoraceae (1). The genus differs from Mucor Mich. ex Fr. and Phycomyces Kunze ex Fr. by having stolons and rhizoids, and from Rhizopus Ehrenb. ex Corda and Absidia van Tieghem by having non-apophysate sporangia. It can further be separated from Rhizopus by hyaline to faintly colored sporangia on repeatedly branched sporangiophores and from Absidia by its globose sporangia. Actinomucor resembles Rhizomucor (Lucet et Cost.) Wehmer ex Vuill. in having stolons, rhizoids and non-apophysate sporangia. It is distinct from that genus, however, by formation of hyaline to faintly colored sporangia and by temperature requirements for growth (1,3,4).

Recently, two strains of molds used in manufacture of sufu in Taiwan were deposited with the American Type Culture Collection (ATCC) as Mucor sp. and have been accessioned as ATCC 52360 and ATCC 52370. Sufu is a traditional Oriental food made from soybean milk and mainly used as an appetizer. Cultures of these two strains on a variety of media show characteristics of the monotypic genus Actinomucor, but differ from the type species A. elegans in the size of sporangiospores. It is therefore named as a new species and described herein. The description is based upon cultures grown on potato dextrose agar (PDA) for one week in the laboratory where temperature and light conditions varied.

Actinomucor taiwanensis Jong et Yuan, sp. nov.

Coloniae in agaro PDA albae, in aetate griseae, repide crescentes; hyphae stolonifae; rhizoidae hyalinae, 20 µ diam; sporangiophora, sporangia et columellae eis speciei A. elegans

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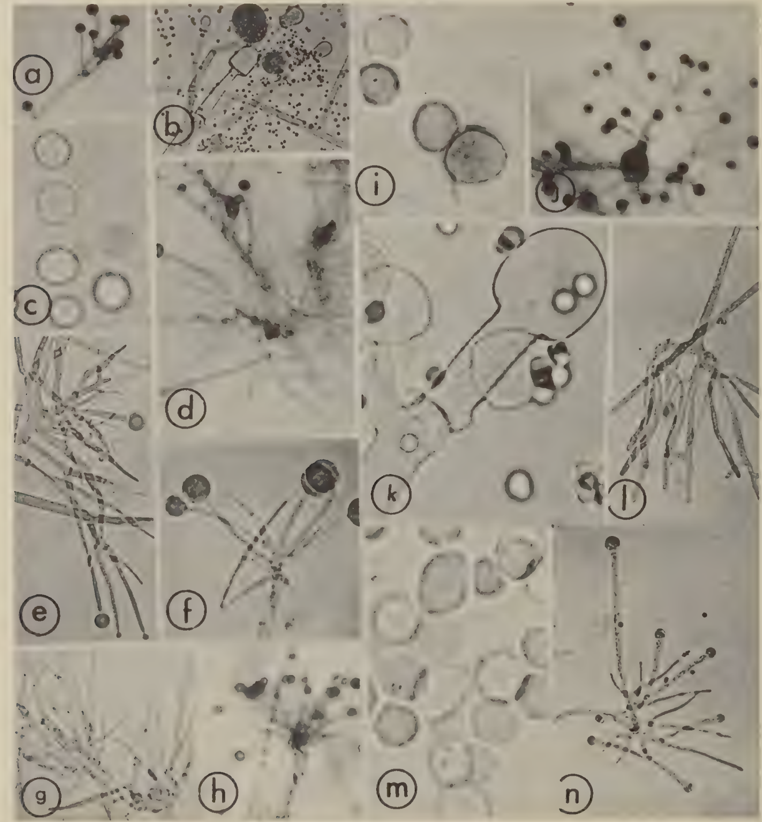
*Visiting Scientist from the Food Industry Research and Development Institute, Hsinchu, Taiwan, ROC.

similiae; sporangiophora hyaline usque pallide brunnea, levia, 25 µ diam, ramosae; sporangia 40-70 µ diam, globosa, subhyalinae, striatae, polyspora; columellae 50-80 x 20-60 µ, pyriformia, hyalinae vel subhyalinae; sporangiosporae globosae vel ellipsoidalia, unicellularia, levia, 7-15 µ diam; chlamydosporae magnitudine varia; zygosporae ignote; ad 37°C crescens. Typus ATCC 52370.



Figs. a-d. Actinomucor elegans ATCC 22814. a: Sporangia and branch of sporangiophores, X 30. b: Sporangia, X 100. c: Sporangiospores, X 1,000. d: Rhizoids, X 30. Figs. e-i. Actinomucor taiwanensis ATCC 52360. e: Rhizoids, stolons and young sporangia X 100. f: Sporangia, X 100. g: Rhizoids, X 100. h: Sporangia in cluster, X 30. i: Sporangiospores, X 1,000. Figs. j-n. Actinomucor taiwanensis ATCC 52370. j: Sporangia and branch of sporangiophores, X 30. k: Sporangia, X 450. l: Rhizoids, X 100. m: Sporangiospores, X 1,000. n: Rhizoids, stolons and young sporangia, X 100.

Colonies on PDA at first white and cottony with sterile aerial mycelia, becoming white to olive-buff in age, over 1 cm in height; stolons and rhizoids present, colorless; stolons branched, up to 20 µ in diameter; rhizoids repeatedly branched, well-developed, up to 20 µ in diameter; sporangiophores whorled branched, variable in length, up to 25 µ in diameter, smooth-walled, originating short distance below the terminal sporangia and bearing secondary sporangia subtended by cross-walls; sporangia globose to subglobose, slightly spinous to spinous, mostly 40-70 µ in diameter, but occasionally up to 100 µ in diameter, buff to gray in color; columellae elongate-oval to pyriform, hyaline to faintly colored, mostly 50-80 X 20-60 µ; apophysis lacking; sporangiospores continuous, smooth, heavywalled, globose, ovoid, ellipsoid or irregular, mostly 7-15 µ in diameter, up to 20 µ in diameter, hyaline or gray-black in mass; chlamydospores present, variable in size and shape; zygospores unknown; growth at 37°C but not at 45°C.

Both ATCC 52360 and ATCC 52370 were originally isolated in 1946 from sufu samples collected at Fuchow Sufu Factory in Hsintsuan near Taipei, Taiwan. ATCC 52370 is designated as the type and is being preserved by freeze-drying and freezing in liquid nitrogen at -196°C.

Actinomucor taiwanensis grows and sporulates on a variety of media at temperatures from 15 to 37°C. At 45°C no growth occurred in more than a month. At 37°C ATCC 52370 grows better than ATCC 52360, therefore, the former has been used as inocula for production of sufu during the summer in Taiwan. Details of the manufacture of sufu by this species were reported by Lin *et al.* (2).

The new species has been compared with the neotype ATCC 22814 of *A. elegans.* These two species differ principally on the basis of sporangiospore size. In *A. elegans* sporangiospores are 5-8 µ in diameter as against 7-15 µ in *A. taiwanensis.* In addition, the maximum growth temperature is 32°C for *A. elegans* and 37°C for *A. taiwanensis* (1). As noted by Benjamin and Hesseltine (1), *A. elegans* grows luxuriantly on Czapek's solution agar which was not found to support good growth of *A. taiwanensis.*

We acknowledge with appreciation the critical review of the manuscript made by Mary Jane Gantt and Elmer Davis. The work was supported in part by National Science Foundation Grant DEB 7921031 and National Institutes of Health Contract NO1-RR-2-2139.

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Sexual Reactions of Rhizopus stolonifer and R. circinans

Gwo-Fang Yuan*, Shung-Chang Jong and Elmer Davis

Mycology and Botany Department, American Type Culture Collection
12301 Parklawn Drive, Rockville, Maryland 20852

Summary

The sexuality of all ATCC strains of Rhizopus stolonifer (Ehrenb. ex Fr.) Vuill. and R. circinans van Tieghem was determined. Plus and minus strains used in intraspecific matings of both species produced zygospores. No mature zygospores were obtained as a result of interspecific matings of the plus and minus strains.

Rhizopus stolonifer (Ehrenb. ex Fr.) Vuill., a cosmopolitan black mold, assumes economic importance because it is capable of causing serious post-harvest losses in several crops. It is a well-defined heterothallic species (1,5). Sexuality is based on the interaction of plus (+) and minus (-) mating strains which can be crossed to produce zygospores. Single germinating zygospores produce sporangia containing spores which, when cultured, react as either all plus, all minus, or as mixtures of the two mating types (2,3).

Rhizopus circinans van Tieghem resembles R. stolonifer except that the former has recurved sporangia and smaller sporangiospores (8). Zycha (7,8) synonymized R. circinans and R. reflexus Bain. However, Schipper (5) has recently regarded R. reflexus as synonymous to R. stolonifer var. lycoccos (Ehrenb. ex Fr.) Stalpers et Schipper and considered R. circinans of doubtful identity. In this study, Zycha's recognition of R. circinans as a taxon is accepted.

During the course of our current investigation into sexuality of Rhizopus Ehrenb., all ATCC strains of Rhizopus were grown individually and were mated in all combinations on a variety of media (e.g., potato dextrose, malt, Czapek's and Emerson's agars, etc.) and incubated at 15, 20, 30, 37, and 45 °C. Examinations were made after 7, 14 and 21 days of incubation.

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*Visiting Scientist from the Food Industry Research and Development Institute, Hsinchu, Taiwan, ROC.

In the strains identified as R. stolonifer and R. circinans, the optimum growth temperature was 25-30°C and the optimum temperature for zygospore formation was 20-25°C. No growth was observed at 37°C. Sporangiophores were usually longer than 1,000 μ and often reached up to 3,000-4,000 μ. Sporangia were larger than 100 μ in diameter and often attained up to 200-280 μ. Rhizoids were well developed. Chlamydospores were not seen. Sporangiospores were subglobose to broadly ellipsoidal, angular, distinctly striated (Figs. A & B). However, strains of R. circinans have smaller sporangiospores produced in sporangia with strongly recurved sporangiophores (Fig. B). In R. circinans, sporangiospores were 4-11 μ (mostly 5-8 μ) as against 5-18 μ (mostly 7-10 μ) in R. stolonifer.

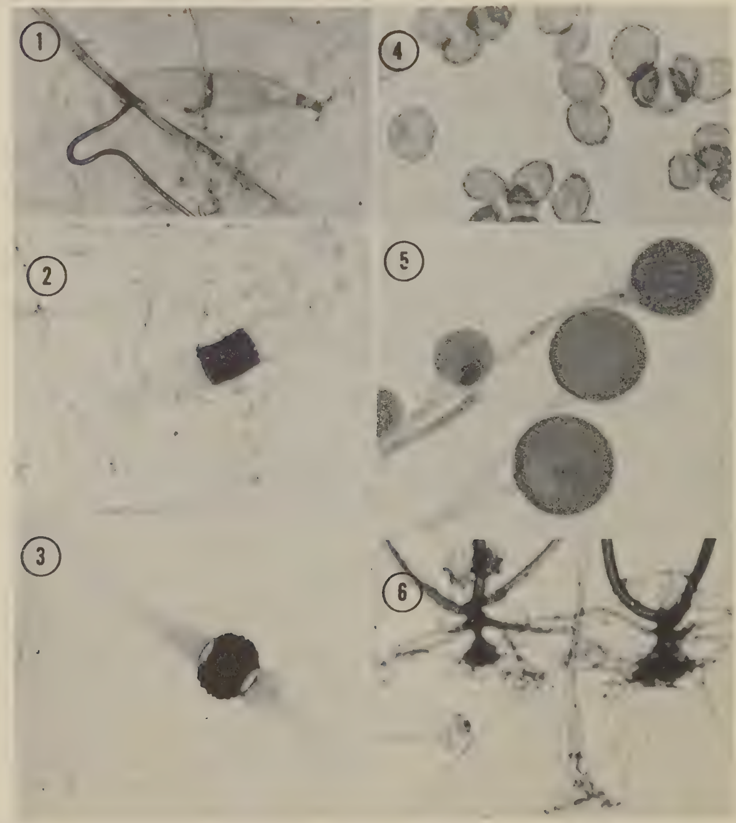

Fig. A. Rhizopus stolonifer. 1-3. Zygospore formation of ATCC 34103 X ATCC 14037, X 100. 4. Sporangiospores (ATCC 42555, X 1,000. 5. Sporangia (ATCC 13429), X 100. 6. Rhizoids (ATCC 13429), X 100.

All the strains of both species were self-sterile. The fusion of plus (+) and minus (-) gametangia in formation of mature zygospores was found only in matings of compatible strains of the same species (Figs. A & B).

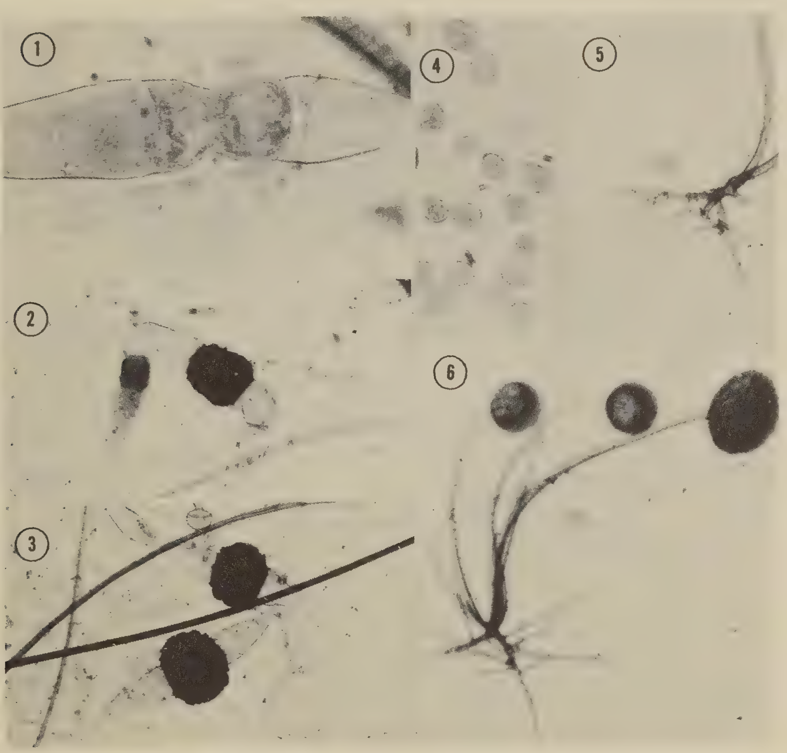

Fig. B. Rhizopus circinans. 1-3. Zygospore formation of ATCC 34101 X ATCC 34106, 1. X 450. 2-3. X 100. 4. Sporangiospores (ATCC 1225, X 1,000. 5. Rhizoids (ATCC 1225), X 100. 6. Sporangia and nodded sporangiosphores (ATCC 56021), X 100.

As in interspecific matings in different species of Mucorales described by Stalpers and Schipper (6), zygospores in interspecific matings of R. stolonifer and R. circinans ceased to develop at an earlier stage than those of intraspecific matings (Fig. C). Further interspecific matings were attempted between all strains of the two species, but again all resulted in incomplete mating reactions. Gametangial copulations failed to take place normally and one or both of the gametangia, in the absence of lysis of the fusion wall, gave rise to a parthenogenetic zygospore.

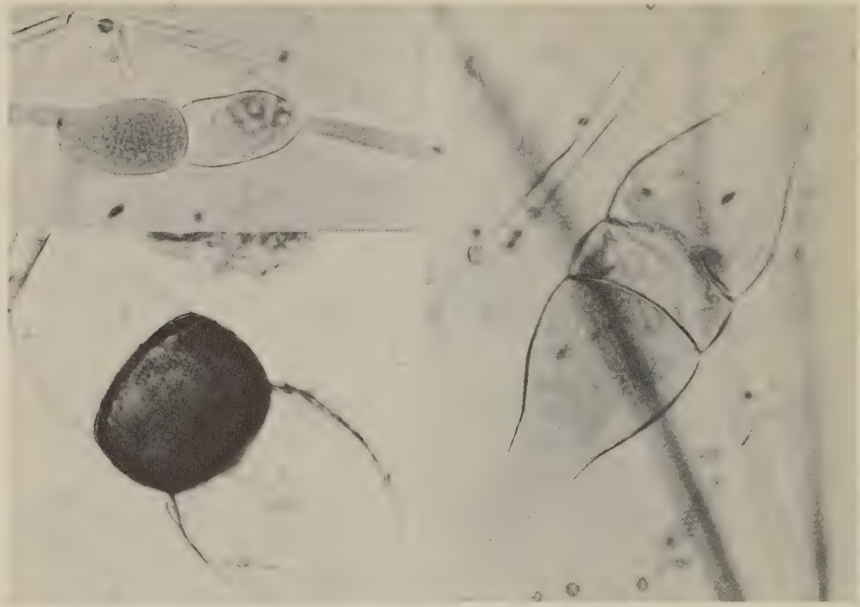

Fig. C. Incomplete mating of *Rhizopus stolonifer* ATCC 46281 X *R. circinans* ATCC 34101. X 450.

The occurrence of zygospores was usually observed in the intraspecific mating when mycelia grew vigorously. For examination of the zygospore, it was necessary to remove the aerial mycelia. Zygospores of *R. stolonifer* and *R. circinans* were relatively large compared to those of other accepted *Rhizopus* species. They were usually 100-200 µ in diameter including the coarse conical exospore projections.

The ATCC strains identified as *R. stolonifer* are shown in Table 1 and *R. circinans* are in Table 2. For *R. stolonifer*, ATCC 14037 is designated as mating type plus tester strain and ATCC 14038 as minus tester strain (4). For *R. circinans*, ATCC 44468 is chosen as mating type plus tester strain and ATCC 44469 as minus tester strain (4).

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Table 1. Spore size and sexual reactions of ATCC strains identified as *Rhizopus stolonifer*

ATCC No.	Spore size (μ)		Original Name	Sexuality
6227b	6-18	(8-12)	*R. stolonifer*	+
12938	6-15	(7-10)	*R. stolonifer*	+
13429	5-12	(7-10)	*Rhizopus* sp.	+
14037	6-15	(7-10)	*R. stolonifer*	+
15441	6-15	(7-10)	*R. stolonifer*	+
6227a	6-13	(8-10)	*R. stolonifer*	-
12939	6-15	(7-10)	*R. stolonifer*	-
14038	6-15	(7-10)	*R. stolonifer*	-
16985	6-13	(7-10)	*R. stolonifer*	-
24795	6-12	(7-10)	*R. nigricans*	-
24862	6-13	(7-10)	*R. nigricans*	-
34103	6-12	(7-10)	*R. stolonifer*	-
42555	6-15	(7-10)	*R. stolonifer*	-
46281	5-12	(7-10)	*R. stolonifer*	-
52312	6-12	(7-10)	*R. stolonifer*	-

Table 2. Spore size and sexual reactions of ATCC strains identified as *Rhizopus circinans*

ATCC No.	Spore size (μ)		Original Name	Sexuality
1225	4-18	(5-7)	*R. circinans*	+
34101	5-10	(6-8)	*R. stolonifer*	+
44468	5-11	(6-8)	*R. circinans*	+
52315	4-8	(5-7)	*R. circinans*	+
56021	4-8	(5-7)	*R. circinans*	+
34106	5-9	(5-7)	*R. stolonifer*	-
44469	4-10	(5-9)	*R. circinans*	-

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Direct Evidence of Relationship between Dekkera and Brettanomyces

Shung-Chang Jong, Fwu-Ling Lee* and Linda Bengston

Mycology & Botany Department, American Type Culture Collection
12301 Parklawn Drive, Rockville, Maryland 20852

New direct evidence of the relationship between the yeast form genus Brettanomyces and the ascosporogenous genus Dekkera is presented. Occurrence of ascospore formation in the type cultures (ATCC 10560, ATCC 34448 and ATCC 10559) of the three Brettanomyces species now classified as Dekkera is reported for the first time.

Dekkera van der Walt is the ascosporogenous (perfect) genus of the asporogenous (imperfect) genus Brettanomyces Kufferath et van Laer. These two genera differ only in that Dekkera shows alternation of generations with the formation of generations of asci and ascospores (3,4). Three species, viz., D. bruxellensis van der Walt, D. intermedia van der Walt and D. anomala M. Th. Smith et van Grinsven, are now recognized in the genus Dekkera (2,6). However, no ascospore formation was observed with type cultures of their Brettanomyces species at the time the perfect and imperfect relationship was established (2,3). This paper illustrates the first direct evidence of the Dekkera life cycle in the type cultures of Brettanomyces.

According to van der Walt and van Kerken (8) and van der Walt (3,4), the induction of ascus formation in strains classified as Dekkera depends greatly on media which have been adequately enriched with vitamins. Yeast extract-malt extract agar, referred to as YM agar (Difco 0712), supplemented with a vitamin solution (containing 0.2 mg biotin, 40 mg calcium pantothenate, 0.2 mg folic acid, 200 mg inositol, 40 mg niacin, 20 mg p-aminobenzoic acid, 40 mg pyridoxine hydrochloride, 20 mg riboflavin and 100 mg thiamine in a liter of demineralized water and sterilized by filtration) was used in the present study. The historical information of each strain examined is listed in the sixteenth edition of the ATCC Catalogue of Fungi/ Yeast (1).

Brettanomyces bruxellensis Kufferath et van Laer has been designated as the type species for the genus and ATCC 10560 (=CBS 72) isolated from Belgian lambic beer is the type culture (6,7). Dekkera bruxellensis has been designated as the type species for the genus and ATCC 36234 (=CBS 74) isolated from Belgian stout is the type culture. In both type cultures, vegetative cells were directly transferred into unconjugated evanescent asci with 1-4 ascospores. The ascospores were hat-shaped, liberated after maturation and tend to agglutinate (Fig. 1). The occurrence of ascospore formation in the type culture of the type species of *Brettanomyces* has further confirmed the relationship between *Dekkera* and *Brettanomyces.* Ascospore formation was also observed in two additional strains (ATCC 48017 and ATCC 56461) of *B. bruxellensis.*

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*Visiting Scientist from the Food Industry Research and Development Institute, Hsinchu, Taiwan, ROC.

Brettanomyces intermedius (Krumbholz et Tauschanoff) van der Walt et van Kerken is based on the type culture ATCC 34448 (=CBS 73) which was isolated from French grape must (7). In this study the type culture was found to produce asci and ascospores (Fig. 2) similar to those of *Dekkera intermedia,* which were originally found in ATCC 36235 (=CBS 4914), isolated from "tea beer fungus" from Mozambique by van der Walt (3,6). Further examination of the cultures of *B. intermedius* ATCC 34076 and *D. intermedia* ATCC 24196, ATCC 52904 and ATCC 52905 revealed that they all produced ascospores and were morphologically and physiologically identical.

Recently, Smith and van Grinsven (2) described the third species, *Dekkera anomala,* based on CBS 8139 which was isolated from spoiled carbonated, fruit-based soft drinks in Holland. Because the new species is morphologically and physiologically identical with *Brettanomyces anomalus* Custers, it was considered the perfect state of *B. anomalus.* However, the type culture ATCC 10559 (=CBS 77) of *B. anomalus,* which was isolated from bottled stout of Brass & Co., Burton-on Tran, was not reported to have the *Dekkera* life cycle (2). As shown in Fig. 3, we found the asci and ascospores in ATCC 10559 for the first time. *Dekkera anomala* appears to constitute a well defined species that has been recovered from bottled stout, English cider, French cider, Irish beer and soft drinks.

We acknowledge with appreciation the critical review of the manuscript made by Mary Jane Gantt. The work was supported in part by National Science Foundation Grant DEB 7921031 and National Institutes of Health Contract NO1-RR-2-2139.

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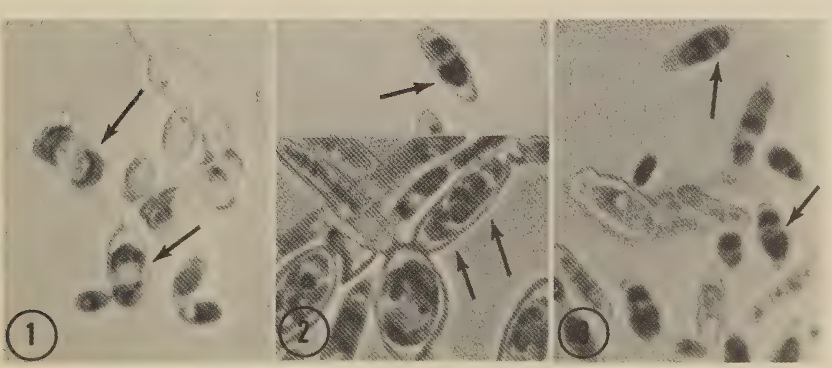

Figs. 1-3. Asci and ascospores stained with Ziehl Neelsen's carbol fucksin. ca. X 2000. 1. *Brettanomyces bruxellensis* ATCC 10560 (type). 2. *B. intermedius* ATCC 34448 (type). 3. *B. anomalus* ATCC 10559 (type).

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Dekkera claussenii sp. nov., The Perfect State of Brettanomyces claussenii

Fwu-Ling Lee* **and Shung-Chang Jong**

Mycology & Botany Department, American Type Culture Collection
12301 Parklawn Drive, Rockville, Maryland 20852

Summary

Dekkera claussenii sp. nov. is described to accommodate the ascosporogenous state (teleomorph) of Brettanomyces claussenii Custers. This species differs morphologically and physiologically from the species presently accepted in the genus Dekkera mainly by absence of blastese and the ability to ferment lactose.

The ascosporogenous genus Dekkera with D. bruxellensis van der Walt as the type species was established by van der Walt in 1964 to accommodate the perfect state of Brettanomyces Kufferath et van Laer. Three species, D. bruxellensis, D. intermedia van der Walt and D. anomala M. Th. Smith et van Grinsven, are now recognized in the genus Dekkera (1,3,6).

In the course of our current investigation into the systematics of the asporogenous yeast genus Brettanomyces, the type and three other strains of B. claussenii maintained in the American Type Culture Collection (ATCC) were examined morphologically and nutritionally. They all were found to produce hat-shaped ascospores on media enriched with vitamins. This paper describes and names Dekkera claussenii sp. nov., the perfect state of Brettanomyces claussenii.

Dekkera claussenii Lee et Jong, sp. nov.

Stat. anamorphosis: Brettanomyces claussenii Custers 1940

In extracto malti post dies 5 25°C, cellulae ovoideae, saepe ogivales, cylindricae elongataeque, (2-5) X (3-18) μ singulae, binae vel catenatae. Cellulae longae pseudomycelii formantur. Sedimentum Aliquando annulus, insulae aut pellicula tenuis. Odor culturae insignitis. Asci e cellulis diploidis tranformatis oriuntur. Ascosporae pilleiformes aut vel globosae cum laminis orbicularis oram tangentibus ad 4 in quoque asco formantur.

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*Visiting Scientist from the Food Industry Research and Development Institute, Hsinchu, Taiwan, ROC

Ascosporae maturae ex ascis celeriter liberantur et inter se agglutinant. Fermentatio, crescentia in variis substantiis carbonaceis et olii characteres monstranur in Tabula 1.

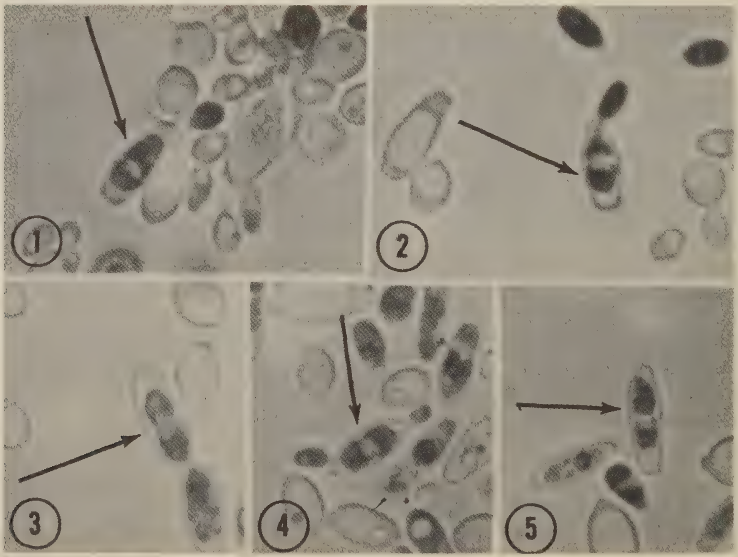
Typus: ATCC 10562 in collectione American Type Culture Collection, Rockville, Maryland.

Growth in malt extract: after 5 days at 25°C the cells are ellipsoidal, frequently ogival, cylindrical to elongate, 2-5 X 3-18 µ reproducing by budding and occurring singly, in pairs or short chains. Filamentous cells are formed. After 10 days at room temperature a sediment and occasionally a slight ring is present. A characteristic aroma is produced.

Growth on malt agar: After 6 weeks at room temperature the streak culture is cream-colored to light brown, somewhat dull to shiny, smooth or with some structure, or somewhat pulvinate. The margin is entire to undulating.

Growth on malt agar 2% calcium carbonate: After 6 weeks at room temperature the streak culture is cream-colored to light brown, shiny, smooth or with some structure and somewhat raised in the center. The margin is entire to undulating. Acid is produced.

Dalmau plate culture on corn meal agar: Pseudomycelium is formed but not very abundantly. It is usually more abundant in anaerobic areas than in aerobic areas. The pseudomycelium is rudimentary and consists of chains or ramified chains of elongated cells.



Figs. 1-5. Asci and ascospores of *Dekkera claussenii*, stained with the modified Schaeffer-Fulton malachite green. X 2,000. 1 & 2: ATCC 10562 (Type). 3. ATCC 20277. 4. ATCC 20323. 5. ATCC 56868.

Formation of ascospores: Vegetative cells are directly transformed into asci, producing one to four ascospores. The ascospores are hat-shaped and can be stained with the modified Schaeffer-Fulton malachite green stain (Figs. 1-5). Mature ascospores tend to agglutinate when liberated. Ascospore formation is observed a week after inoculating on YM agar (at pH 4.5) supplemented with vitamins.

Physiological characteristics: Fermentation and growth on various carbon compounds, growth on nitrogen sources and some additional properties are summarized in Table 1.

Table 1: Physiological Characteristics of *Dekkera claussenii*

Fermentation

D-Glucose +
D-Galactose - or D
Maltose + or D
Me a-D-glucoside +
Sucrose +
a,a-Trehalose +
Melibiose -
Lactose + or D
Cellobiose +
Melezitose +
Raffinose - or D
Inulin -
Starch -

Growth

D-galactose + or D
L-Sorbose -
D-Glucosamine + or -
D-Ribose -
D-Xylose -
L-Arabinose -
D-Arabinose -
L-Rhamnose -
Sucrose + or D
Maltose + or D
a,a-Trehalose + or D
Me a-D-glucoside + or D
Cellobiose + or D
Salicin + or D
Arbutin + or D
Melibiose -
Lactose + or D
Raffinose + or -
Melezitose + or D
Inulin -
Starch -
Glycerol - or D
Erythritol -
Ribitol -
D-Glucitol-
D-Mannitol -
Galactitol -
myo-Inositol -
DL-Lactate + or -
Succinate + or -
Citrate -
Methanol -
Ethanol + or D
Nitrate + or -
Nitrite +
Ethylamine +
w/o Vitamins -
at 25 C +
at 30 C +
at 35 C +
at 37 C + or -
at 45 C -
50% D-Glucose -
60% D-Glucose -

Additional Characteristics

Starch formation -
Diazonium Blue B reaction -
Acetic acid production +
Urea hydrolysis -

Code in table: (+) positive; (-) negative; (D) delayed for longer than 7 days

The type culture ATCC 10562 (=CBS 76) is the type culture of *Brettanomyces claussenii* Custer. Therefore, the new species *Dekkera claussenii* Lee et Jong is the perfect state (teleomorph) of *B. claussenii* (Figs. 1 & 2). It differs from *Dekkera anomala* in absence of blastese, non-septate filamentous cells which often branch and resemble a ramified, one-celled mycelium, and can be distinguished from both *D. bruxellensis* and *D. intermedia* by its ability to ferment lactose.

Three other strains (ATCC 20277, ATCC 20323 and ATCC 56868) are morphologically and physiological identical to the type culture ATCC 10562 (Figs. 1-5). The historical information of each strain is listed in the sixteenth edition of the ATCC Catalogue of Fungi/ Yeasts (2).

This species has been isolated from beer, cider and sherry vat (6). ATCC 20277 and ATCC 20323 are cited in U.S. Patent 3,733,253 and U.S. Patent 3,801,455, respectively, for production of citric acid (4,5).

We acknowledge with appreciation the critical review of the manuscript by Mary Jane Gantt. The work was supported in part by the National Science Foundation Grant DEB 7921031 and National Institutes of Health Contract NO1-RR-2-2139.

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Identity of *Brettanomyces custersii*

Fwu-Ling Lee* and Shung-Chang Jong
Mycology and Botany Department, American Type Culture Collection
12301 Parklawn Drive, Rockville, Maryland 20852

Examination of *Brettanomyces custersii* ATCC 34447 (type), *B. intermedius* ATCC 34448 (type), *Dekkera intermedia* ATCC 36235 (type) and additional six strains reveals that they all produce asci containing 1-4 hat-shaped ascospores and are morphologically and physiologically very similar. Thus, the name *B. custersii* Florenzano, 1950, is proposed to be a later, facultative synonym of *B. intermedius* (Krumbholz et Tauschanoff) van der Walt et van Kerken, 1933, and the imperfect (anamorphic) state of *Dekkera intermedia* van der Walt, 1964.

Brettanomyces custersii Florenzano was first described from four strains recovered from red Paduan wines. According to van der Walt (9), these original strains were lost, and the strain ATCC 34447 (=CBS 5512), which was isolated by van der Walt from contaminated equipment in a sorghum beer brewery in 1961, is the neotype for the species. As far as we are aware, it is the only strain currently available for the species in the major culture collections, e.g., American Type Culture Collection (ATCC) (4), Centraalbureau voor Schimmelcultures (CBS) in the Netherlands (2) and Institute for Fermentation (IFO) in Japan (3).

According to van der Walt (9), morphologically and physiologically *B. custersii* was closely allied to *B. intermedius* (Krumbholz et Tauschanoff) van der Walt et van Kerken. *B. custersii* was distinct in that it showed a latent utilization of lactose a property which *B. intermedius* lacked. Studying more than ten strains of both species, including the type strains, which were maintained in the CBS, Barnett *et al.* (1) found that they all were negative in lactose utilization. However, in the recently published edition of "THE YEASTS", a taxonomic study edited by N.J.W. Kreger-van Rij (5), van der Walt in his identification key to the species of the genus still separates the two species on the basis of whether or not lactose is assimilated (11).

Ascospore formation was observed in certain strains of *B. intermedius* by van der Walt in 1960 and *Dekkera intermedia* van der Walt was established to accommodate this ascogenous or perfect

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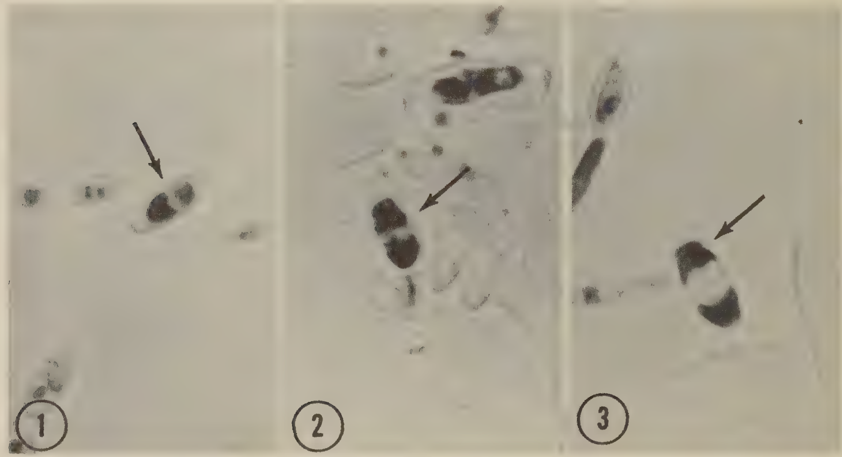
*Visiting Scientist from the Food Industry Research and Development Institute, Hsinchu, Taiwan, ROC.

(teleomorphic) state (7). *D. intermedia* appears to constitute a well defined species that has been recovered from grape musts, wines from Arbois, Maconnais, Bordeaux, Moselle, the Gironde, Medoc, and South Africa, winery equipment, contaminated equipment in a sorghum beer brewery, beer, coca-cola, and "tea beer fungus" (2,4,10).

In our authentication of the yeast strains maintained in the mycological collection of the ATCC, we have examined the cultures of *Brettanomyces custersii* ATCC 34447 (type), *B. intermedius* ATCC 34076, ATCC 34448 (type), ATCC 56866 and ATCC 56869, and *Dekkera intermedia* ATCC 24196, ATCC 36235 (type), ATCC 52904 and ATCC 56865. On yeast extract-malt extract agar referred as YM agar (Difco 0716) at pH 4.5 supplemented with a vitamin solution (12), they all produced evanescent asci containing 1 to 4 hat-shaped ascospores (Figs. 1-3). The results of our physiological tests are shown in Table 1. All nine strains tested were unable to utilize lactose as reported by Barnett *et al.* (1), although van der Walt (11) reported ATCC 34447 (=CBS 5512), the type of *B. custersii*, to assimilate lactose and used this ability as a key characteristic to distinguish *B. custersii* from *B. intermedius*.



Figs. 1-3. Asci and ascospores stained with Ziehl Neelsen's carbol fuchsin. ca. X 2000. 1. *Brettanomyces intermedius* ATCC 34448 (type). 2. *B. custersii* ATCC 34447 (type). 3. *Dekkera intermedia* ATCC 36235 (type).

The major differences among the strains were assimilation of nitrate and nitrite, growth at 37°C and fermentation of galactose. In the investigation of the utilization of nitrite by *Brettanomyces* species which failed to utilize nitrate, van der Walt (6) advocated that both nitrate-positive and nitrate-negative strains be retained in *B. intermedius*. Variable responses to growth in nitrate and nitrite, and at 37°C are accepted by Barnett *et al.* (1) for *Dekkera intermedia*. We consider the difference in galactose fermentation to be significant only at the strain level and not at the specific level, because this fermentation ability was negative according to Barnett *et al.* (1) and positive according to van der Walt (10,11).

Sexually and asexually, we are convinced that all the nine strains studied represent the same species. Consequently, *Brettanomyces custersii* Florenzano, 1950, becomes a later, facultative synonym of *Brettanomyces intermedius* (Krumbholz et Tauschanoff) van der Walt et van Kerken, 1933 and the imperfect (anamorphic) state of *Dekkera intermedia* van der Walt, 1964.

We acknowledge with appreciation the critical review of the manuscript made by Dr. Robert Gherna. The work was supported in part by National Science Foundation Grant DEB 7921031 and National Institutes of Health Contract N01-RR-2-2139.

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Table 1. Physiological Test Results

	B. custersii	*B. intermedius*				*D. intermedia*			
	ATCC 34447	ATCC 34076	ATCC 34448	ATCC 56866	ATCC 56869	ATCC 24196	ATCC 36235	ATCC 52904	ATCC 56865
Ascospore formation	+	+	+	+	+	+	+	+	+
Growth in vitamin-free medium	-	-	-	-	-	-	-	-	-
Growth at 37°C	+	+	+	+	+	+	+	+	-
Splitting for arbutin	+	+	+	+	+	+	+	+	+
Fermentation of:									
Glucose	+	+	+	+	+	+	+	+	+
Galactose	+	-	-	-	-	D	D	D	D
Maltose	+	+	+	D	+	+	+	D	+
Sucrose	+	+	+	D	+	+	+	D	+
Lactose	-	-	-	-	-	-	-	-	-
Raffinose	-	-	-	-	-	-	-	-	-
Melibiose	-	-	-	-	-	-	-	-	-
Inulin	-	-	-	-	-	-	-	-	-
Cellobiose	+	+	+	D	+	+	+	+	+
Melezitose	+	+	+	D	+	+	+	D	+
Starch	-	-	-	-	-	-	-	-	-
Trehalose	+	+	+	D	+	+	+	+	+
α-Methyl-D-glucoside	+	+	+	D	+	+	+	-	+
Assimilation of:									
Glucose	+	+	+	+	+	+	+	+	+
Galactose	+	+	D	D	+	+	+	+	+
L-sorbose	-	-	-	-	-	-	-	-	-
Maltose	+	+	D	+	+	+	+	+	+
Sucrose	+	+	D	+	+	+	+	+	+
Cellobiose	+	+	D	+	+	+	+	+	+
Trehalose	+	+	D	+	+	+	+	+	+
Lactose	-	-	-	-	-	-	-	-	-

Table 1 (continued)

	B. custersii	*B. intermedius*				*D. intermedia*			
	ATCC 34447	ATCC 34076	ATCC 34448	ATCC 56866	ATCC 56869	ATCC 24196	ATCC 36235	ATCC 52904	ATCC 56865
Melibiose	-	-	-	-	-	-	-	-	-
Raffinose	D	-	-	-	-	-	-	-	D
Melezitose	+	+	D	+	+	+	+	+	+
Inulin	-	-	-	-	-	-	-	-	-
Soluble starch	-	-	-	-	-	-	-	-	-
D-xylose	-	-	-	-	-	-	-	-	-
L-arabinose	-	-	-	-	-	-	-	-	-
D-arabinose	-	-	-	-	-	-	-	-	-
D-ribose	-	-	D	-	D	-	-	-	-
L-rhamnose	-	-	-	-	-	-	-	-	-
D-glucosamine	D	D	D	-	D	D	D	-	D
Ethanol	+	+	D	+	+	D	D	+	+
Methanol	-	-	-	-	-	-	-	-	-
Erythritol	-	-	-	-	-	-	-	-	-
Glycerol	D	D	D	D	D	D	D	D	D
Adonitol	-	-	-	-	-	-	-	-	-
Dulcitol	-	-	-	-	-	-	-	-	-
D-mannitol	-	-	-	-	-	-	-	-	-
D-sorbitol	-	-	-	-	-	-	-	-	-
α-methyl-D-glucoside	+	+	D	+	+	+	+	+	+
Salicin	+	+	D	+	+	+	+	+	+
Inositol	-	-	-	-	-	-	-	-	-
Lactic acid	-	-	-	D	-	-	-	D	D
Citric acid	-	-	-	-	-	-	-	-	-
Succinic acid	-	-	-	-	-	-	-	-	-
Valine	-	-	-	-	-	-	-	-	-
Glycine	-	-	-	-	-	-	-	-	-

Table 1 (continued)

	B. custersii	*B. intermedius*				*D. intermedia*			
	ATCC 34447	ATCC 34076	ATCC 34448	ATCC 56866	ATCC 56869	ATCC 24196	ATCC 36235	ATCC 52904	ATCC 56865
Proline	-	-	-	-	-	-	-	-	-
Arginine	-	-	-	-	-	-	-	-	-
KNO_3	+	+	-	-	-	+	+	-	-
NO_2	+	+	-	-	-	+	+	-	-
Ethylamine	+	+	+	+	+	+	+	+	+

Code in Table: (+) positive; (-) negative; (D) delayed for longer than 7 days

MYCOTAXON

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A NEW SPECIES OF INONOTUS (APHYLLOPHORALES, HYMENOCHAETACEAE)[1] ON OAK IN LOUISIANA

Meredith Blackwell

Department of Botany
Louisiana State University, Baton Rouge 70803

and

R. L. Gilbertson

Department of Plant Pathology
University of Arizona, Tucson 85721

SUMMARY

Inonotus quercustris, a new species on water oak in Louisiana, is described and illustrated. It causes a white trunk rot in living trees. Cultural morphology is also given.

Living trees in urban areas are commonly hosts for a variety of wood-rotting basidiomycetes that decay heartwood in the trunk or roots. Infection courts are often present from the early years after planting as a result of improper pruning and injury from lawn care equipment. In addition, trees planted along paved streets and near structures are often placed under stress which can expedite fungal infection and growth. Large numbers of urban trees can be surveyed easily and regularly by automobile for basidiocarps and other evidence of decay. This technique has been used in obtaining specimens and data on basidiomycetes that cause trunk rots and root rots in southern Louisiana where a variety of oaks and species in other genera are grown as shade and ornamental trees along city streets and in yards of private homes. Among the fungi most commonly encountered on living trees during these surveys are the following: *Armillariella tabescens* (Scop.: Fr.) Sing., *Fomes fasciatus* (Sw.: Fr.) Cke., *Ganoderma lucidum* (W. Curt.: Fr.) Karst., *G. tsugae* Murr., *Hyphoderma baculorubrense* Gilbn. et M. Blackwell, *Inonotus cuticularis* (Bull.: Fr.) Karst., *I. dryadeus*(Pers.: Fr.) Murr., *I. hispidus* (Bull.: Fr.) Karst., *I. ludovicianus* Murr., *Laetiporus persicinus* Berk. et Curt.) Gilbn., *L. sulphureus* (Bull.: Fr.) Murr., *Perenniporia fraxinea* (Bull.: Fr.) Ryv., *P. phloiophila* Gilbn. et M. Blackwell, *Phellinus gilvus* (Schw.) Pat., *P. robustus* (Karst.) Bourd. et Galz., *Pleurotus ostreatus* Jacq.: Fr., *Rigidiporus lineatus* (Pers.) Ryv., *R. ulmarius* (Fr.) Imazeki, *Spongipellis fissilis* (Berk. et Curt.) Murr., *S. pachyodon* (Pers.) Kotl. et Pouz., and *Volvariella bombycina* (Schaeff.: Fr.) Sing.

In addition, in the last two years an undescribed species of *Inonotus* has been collected 5 times from three different streetside water oak (*Quercus nigra* L.) trees in Baton Rouge, Louisiana. This taxon differs distinctly from any previously known species and it is here described as new.

INONOTUS QUERCUSTRIS M. Blackwell et Gilbn., sp. nov.

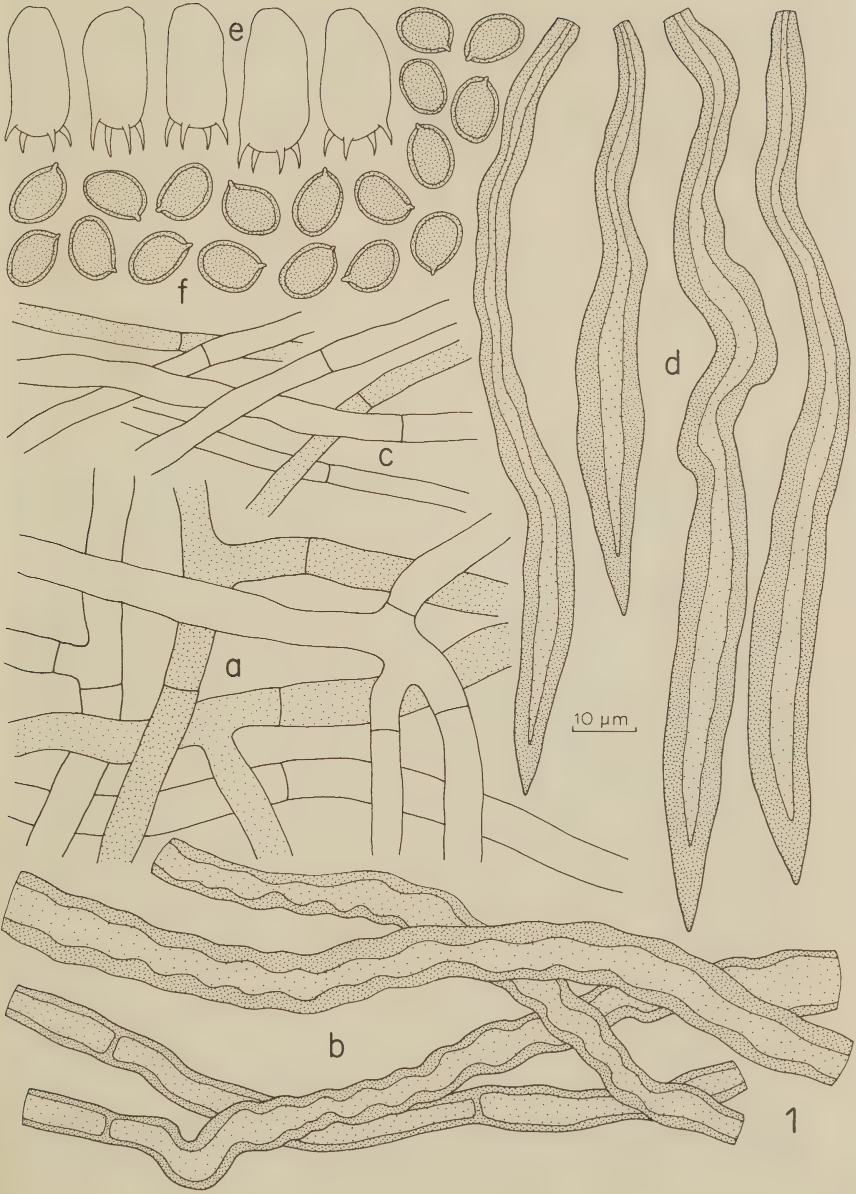
Pileus sessilis, ungulatus vel applanatus; superficies superior flavo-brunnea denum ferruginea, tomentosa; pori angulati, 3-5 per mm, aureo-flava denum flavo-brunnea; contextus mollis, spongiosus denum fibrosus, ferrugineus; hyphae septatae, in contextus tenuitunicatae vel crassitunicatae, 4-10 um in diam, in trama tenuitunicatae, hyalinae vel pallido-aurea, 2.5-4 um in diam; hyphae setoideae crassitunicatae, acutae, 8-10 um in diam; basidia late-ellipsoidea, 4-sterigmatibus, 18-23 x 9-11 um; basidiosporae ellipsoidae, crassitunicatae, pallido aureo-flavae, non-dextrinoidae, 9-10 x 6-8 um. HOLOTYPUS: M. Blackwell No. 1511, in *Quercus nigra* L., Baton Rouge, Louisiana, July 30, 1983; in herb. National Fungus Collections, Beltsville, Maryland (BPI).

Basidiocarps annual, sessile, ungulate to applanate, pilei single to imbricate, up to 20 x 16 x 10 cm; upper surface golden yellow at first, becoming rusty brown, matted-tomentose to short-hispid with short, erect fibrils composed of hyphal aggregates, azonate, usually splotched with darker areas; margin concolorous above, rounded to acute, narrowly sterile below; pore surface bright golden yellow, darkening to dark yellowish brown, glancing, with a bright golden lustre when viewed obliquely, the pores angular, 3-5 per mm, dissepiments thin, covered with fine crystals that give them a finely fimbriate appearance under a 30X lens, becoming lacerate with age; context at first soft and spongy with a high moisture content, in mature specimens becoming firm and fibrous with a softer region next to the tubes, dark reddish brown, with faint concentric zones; tube layer yellowish brown, distinct from context, up to 1 cm thick.

Hyphae of lower context thin-walled, pale golden brown, some with uneven wall thickening, giving them a faintly banded appearance in face view, simple-septate, with occasional branching, 4-8 (-10) um in diam, interwoven, not arranged in a parallel manner, individual hyphae usually curved or undulate; hyphae of upper context thin- to thick-walled, many with irregular secondary wall thickening and undulating to wavy in outline; tramal hyphae thin-walled, simple-septate, hyaline to pale golden brown, with occasional branching, 2.5-4 um in diam; setal hyphae abundant in trama, mostly parallel with the tubes and not projecting, but some angling out past the hymenium into the tubes, thick-walled, with narrow lumen typically extending nearly to the tip, dark reddish brown, tapering to a point, 8-10 um in diam at widest point, narrowed to 3-4 um at basal end, up to 200 um long; hymenial setae absent; basidia broadly ellipsoid with base about the same diam as the apex, 4-sterigmate, 18-23 x 9-11 um, simple-septate at the base; basidiospores pale golden yellow, ellipsoid, thick-walled, smooth, negative in Melzer's reagent, acyanophilous, 9-10 x 6-8 um.

Specimens examined: MB 1511, on living water oak, Steele Blvd., Baton Rouge, East Baton Rouge Parish, LA, July 30, 1983 (HOLOTYPE); MB 1471, on living water oak, Steele Blvd., Baton Rouge (same tree as MB 1511), July 19, 1983; RLG 14997, on living water oak, Myrtledale St., Baton Rouge, Nov. 13, 1983; MB 1809, on living water oak, Steele Blvd.,

Fig. 1. Microscopic characters of *I. quercustris* (MB 1511). a, thin-walled contextual hyphae; b, thick-walled contextual hyphae, some with irregular wall thickening; c, tramal hyphae; d, setal hyphae; e, basidia; f, basidiospores.


e
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Baton Rouge (same tree as MB 1511 and MB 1471), July 25, 1984; MB 1975, on living water oak, Steele Blvd., Baton Rouge (different tree), Sept. 1, 1984.

Inonotus quercustris is characterized by the distinctive setal hyphae with a tapered base, the absence of hymenial setae, and the large, pigmented spores. Other *Inonotus* species with pileate basidiocarps and setal hyphae include *I. glomeratus* (Pk.) Murr., *I. patouillardii* (Rick) Imazeki, and *I. rickii* (Pat.) Reid. *Inonotus glomeratus* has conspicuous hymenial setae and basidiospores that are 5-7 x 4.5-5 um. It does not fruit on living trees. *Inonotus patouillardii* is known only from Arizona in North America and has basidiocarps with a hard, flinty context and basidiospores that are 6-8 x 4-4.5 um. *Inonotus rickii* has chlamydospores in the context and produces a *Ptychogaster* stage in nature and in culture. In North America it is known only in the ptychogastric stage (Davidson et al., 1942a; Gilbertson and Ryvarden, 1985). It also has smaller basidiospores, 6-8.5 x 4.5-5.5 um. Basidia and basidiospores of *I. quercustris* are similar in size and shape to those of *I. hispidus* (Bull.: Fr.) Karst., a species which also decays oaks and fruits on living trees in the southeastern U.S. Basidiocarps of *I. hispidus* generally have a strongly hispid upper surface and differ also in lacking setal hyphae and in having rare to frequent hymenial setae.

Specimens MB 1471, MB 1511, RLG 14997, and MB 1809 were collected from the main trunk 5-14 feet above the ground. MB 1975 was collected from a large branch 15 feet above the ground.

Cultural studies: cultures examined: MB 1511, 1809, 1975, and RLG 14997 as listed previously. Cultural studies were carried out using the techniques of Nobles (1965).

Growth slow, forming a mat 1.2-1.8 cm in diam in 14 da at 24 C; margin white, 2-3 mm wide, gradually changing to yellow, then brown within 0.5 mm from the edge; mat surface adherent, felty to more cottony and yellow in RLG 14997, somewhat glistening, usually rather irregular in outline; a brown, water soluble pigment causing a halo 1-3 cm from colony margin; odorless; oxidase reaction on gallic and tannic acid media positive.

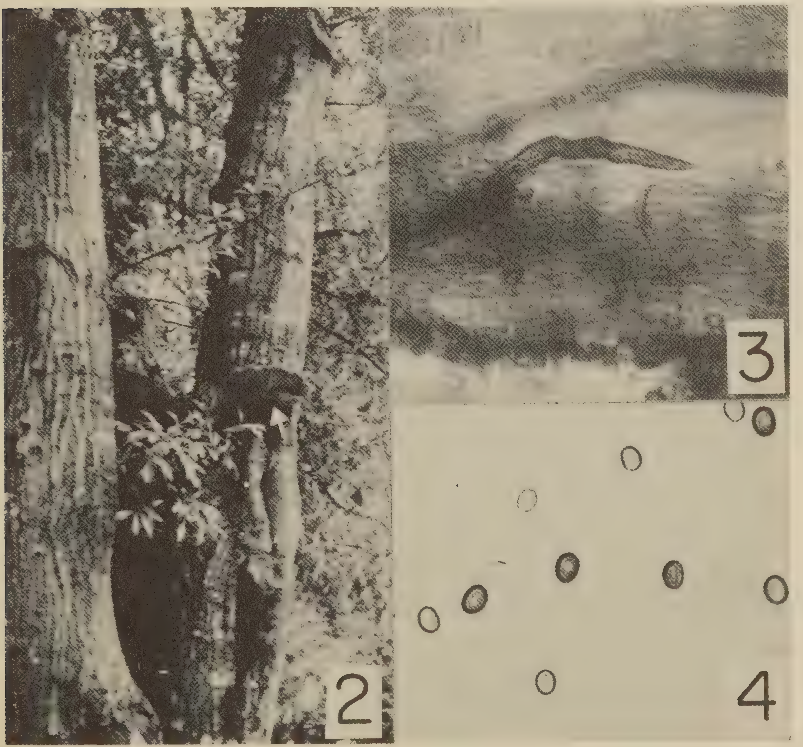
Hyphae at edge of margin hyaline, thin-walled, mostly unbranched, staining with phloxine, 2-4 um in diam, few non-staining hyphae 2-3 um in diam, also a few brown, staining hyphae 2.5-3 um in diam; surface hyphae at center of culture little branched, mostly brown, staining, 3-6 um in diam, few non-staining, 2.5-3.5 um in diam, some hyaline, staining hyphae, 3-5 um in diam; all hyphae simple-septate; no modified hyphal structures, asexual spores, or fruiting bodies present in cultures after 6 weeks.

The key pattern according to Davidson et al. (1942b) is B-P-S-11. The species code according to Nobles (1965) is 2.6.7.32.37.38.46.54.

Although setal hyphae are conspicuous in the trama of *I. quercustris*, they were never observed in any of our cultures after 6 wk. In the absence of any special structures, the cultures of *I. quercustris* have no outstanding characters other than the slow growth rate and the dark brown pigment in older cultures. *Inonotus hispidus*, which is similar to *I. quercustris* in basidiocarp morphology, is reported by Davidson et al. (1942b) to produce setal hyphae in culture. Stalpers (1978) reports that cultures of *I. hispidus* examined by him do not have setal hyphae. We have not observed setal hyphae in any North American collections and they are not reported by Overholts (1953) or Ryvarden (1978, for European specimens) as occurring in basidiocarps of *Inonotus hispidus*. The optimum temperature for growth of *I. quercustris* in culture is approximately 30 C (Table 1).

Table 1. Growth rate of *Inonotus quercustris* in millimeters at temperatures of 15-40 C on Nobles agar medium. Based on means from three replicates of each isolate at each temperature.

	Isolate			
Temp C	1511	1809	1975	14997
15	6.0	5.0	4.9	7.3
20	10.2	9.3	7.0	10.6
25	16.2	18.0	12.5	17.3
30	20.2	21.0	18.5	26.0
35	15.8	16.5	19.1	22.3
40	trace	trace	trace	trace



Figs. 2-4. *Inonotus quercustris*. 2, Basidiocarp on living water oak 14 ft above the ground; 3, basidiospores; 4, setal hypha in trama.

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INONOTUS FIMBRIATUS NOV. SP. (HYMENOCHAETACEAE, BASIDIOMYCETES)

by

LUIS D. GOMEZ

Museo Nacional, Apartado 749-1000,
San José, Costa Rica

and

LEIF RYVARDEN

Dep. of Botany, Inst. of Biology, Univ. of Oslo
P.O. Box 1045, N-0316 Oslo 3, Norway

Inonotus fimbriatus Gomez & Ryv. nov. sp.
Fructificatio pileata, pileus aureus vel brunneus, hispidus vel fimbriatus, pori facies, cinnamomea, pori angulati, 3-4 per mm, systema hypharum monomiticum, hyphae generatoriae afibulatae, setae presentes, uncatus, 40-50 x 6-11 µm, hyphae skeletales dissepimentes incrustatae, sporae ellipsoideae, pallidae fulignosae, 5-6 x 4-4.5 µm, IKI -. Type: Costa Rica, Rosa National Park, in moist forest. 30. Nov. 1983, leg. L. D. Gomez & R. Alfaro 22164. Holotype in Herb. O, Isotype in Herb. CR.

Basidiocarp annual, pileate, sessile, up to 2 cm wide and long, 1 cm thick at the base, upper surface strongly hispid to fimbriate, deep golden brown, azonate, pore surface deep golden brown, pores round to angular, 3-4 per mm, tubes up to 2 mm deep, context homogeneous, golden brown.
Hyphal system monomitic, generative hyphae with simple septa, in the context and trama thick-walled with scattered septa, golden brown, 3-8 µm wide, in the subhymenium more thin-walled, 3-5 µm wide, in the dissepiments many encrusted hyphae, partly projecting, setae present in hymenium, straight to hooked, thick-walled and dark brown, 40-50 x 6-11 µm, spores pale rusty brown, ellipsoid, smooth, 5-6 x 4-4.5 µm, basidia not seen.

In Peglers (1964) synopsis of **Inonotus** , this species will key out close to **Inonotus pertenuis** Murr., to which it is undoubtedly related.

However, this is a much thinner species and its colour is deeper rusty brown. Further, the pores are smaller, (5-7 per mm) and the setae are all straight and wider (10-20 µm). The spores are also slightly narrower (5-7 x 3.5-4.5 µm).

References: Pegler, D.N. 1964: A survey of the genus **Inonotus** (Polyporaceae). Trans. Br. mycol. Soc. 47:175-195.

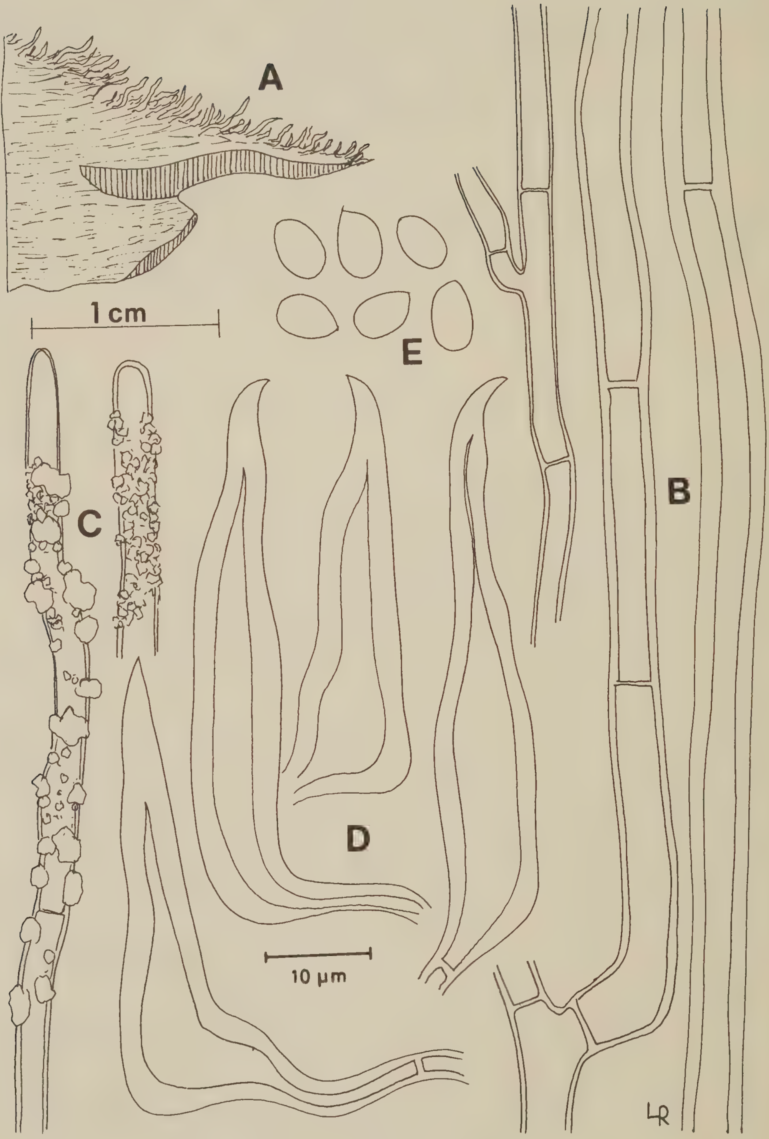

Fig. 1. Inonotus fimbriatus A) Section through basidiocarp, B) Generative hyphae from context, C) encrusted hyphae from the dissepiments, D) setae, E) spores. From the holotype.

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A NOTE ON PORIA AND HEXAGONIA (POLYPORACEAE, BASIDIOMYCETES)

by

LEIF RYVARDEN

Botany Div., Dep. of Biology, Univ. of Oslo,
P.O. Box 1045, Blindern, N-0316 Oslo 3, Norway

SUMMARY

Poria Adans. is rejected as a nomen ambiguum while *Hexagonia* Poll. sensu Fr. is proposed for conservation.

In 1981 the International Code of Botanical Nomenclature (ICBN) changed the socalled starting point for fungi from 1821 to 1753. This solved some problems, but not unexpectedly, it also created some new ones. *Poria* and *Hexagonia*, both well known genera of polypores, were affected by this change as neither of the two were used by Fries (1821) in his Systema Mycologicum which were given special conservation against previous homonyms and synonyms.

Poria Adanson 1763.
Up to 1981 *Poria* was validated by S. F. Gray (1821) and was then typified by *Boletus medulla-panis* Jacq. sensu Pers. However, *Poria* had been used uncritically for all types of resupinate polypores and were not used in modern treatments of polypores. The reason was probably Donk's (1960) suggestion: "I recommend that *Poria* be treated as if the name were not associated with a generally acceptable type species, which after all well may be the actual situation". Thus, even if *Perenniporia* Murr. is typified by the same species as *Poria* S. F. Gray it was still commonly accepted as a valid genus., for example by Donk himself (1967).

The recent change in ICBN has however induced Ginns (1984) and Teixeira (1983) to reintroduce *Poria*. Unfortunately both have overlooked that Adanson 1763 is now the author of *Poria* and not Persoon 1797. The use of *Poria* in the sense of Persoon is not valid, as he published an illegitimate homonym.

Poria, Adans.
Fam. Plant. 2:10, 1763.
Original diagnosis: Chapeau demi-orbicularie double endessous de tuyaux verticaux. Porte sure une tige laterale. Substance: Charnue ou subereuse. Graines: Ovoides couvrant la surface interne des trous".
Type species: Micheli 1729 pl. 61 fig. 2.

The type species is shown on Fig. 1.
In my opinion there is no sense to make a guess as to what species is shown on the plate. As Poria has been used over almost 200 years for resupinate polypores, it would amount to almost madness now to try to use the name for a stipitate polypore which identity is more than dubious. Thus, Poria Adans. is strongly proposed to be rejected as a nomen ambiguum, and let the name die in silence.

While Ginns (1984) only tried to reintroduce Poria sensu Persoon, Teixeria (1983) also muddled with Perenniporia Murr. and still treats Poria as it was validated by S. F. Gray 1821 and concludes then that Poria and Perenniporia Murr. have the same type species. Instead of rejecting Perenniporia like Ginns did, as a synonym of Poria, Teixeira propose to change the type species of Perenniporia! One could easily imagine the chaos that would arise if one was allowed to change the type species whenever a genus was found to be a synonym of another. The whole procedure is against the IBCN and rests besides on a completely wrong assumption as to the author of Poria.

Hexagonia, Pollini.
Horti veron. Pl. nov. p. 35, 1816.
Under the pre-1981 starting point of 1821, the genus was validated by Fries (1835) who changed the original concept and introduced (Fries 1838) many species of which Hexagonia crinigera Fr. is the most commonly accepted type species, for example in Fidalgos (1968) monograph of the genus. Pollini used the genus for a single Italian species which today is commonly accepted as Polyporus mori (Poll.) Fr. as a member of Polyporus s. str.

The change of starting point made Hexagonia Poll. a taxonomical synonym of Polyporus Fr. 1821 and automatically left the species previously grouped under Hexagonia Fr. 1836 without a proper name. Jülich (1984) was aware of this and proposed to adopt Scenedium Kuntze 1898 for a restricted number of species as he followed Fidalgo (1968) in his generic concept. Such a procedure is legal, but do not contribute to the objective of the ICBN, i.e. to stabilise and avoid confusion in naming of plants and fungi.

The name Hexagonia sensu Fr. 1835 has been accepted from the very start, although the earlier mycologists had a much wider concept than are commonly accepted today. Almost any polypore with fairly large to large hexagonal pores were transferred to or described in the genus. When Fidalgo (1968) wrote the monograph of the genus, she discussed the genus and her concept has achieved wide acceptance in herbaria and literature. The once very artificial genus is now reduced to a much more natural taxon. Personally I see no reason to reject the commonly accepted and used name and now reintroduce a generic name that has slept in oblivion since it was proposed. If conservation should be used, this is a most apparent case. Thus, I propose to conserve Hexagonia Fr. 1835 with H. crinigera Fr. as type species against Hexagonia Poll. 1816 with H. mori Poll. as type species.

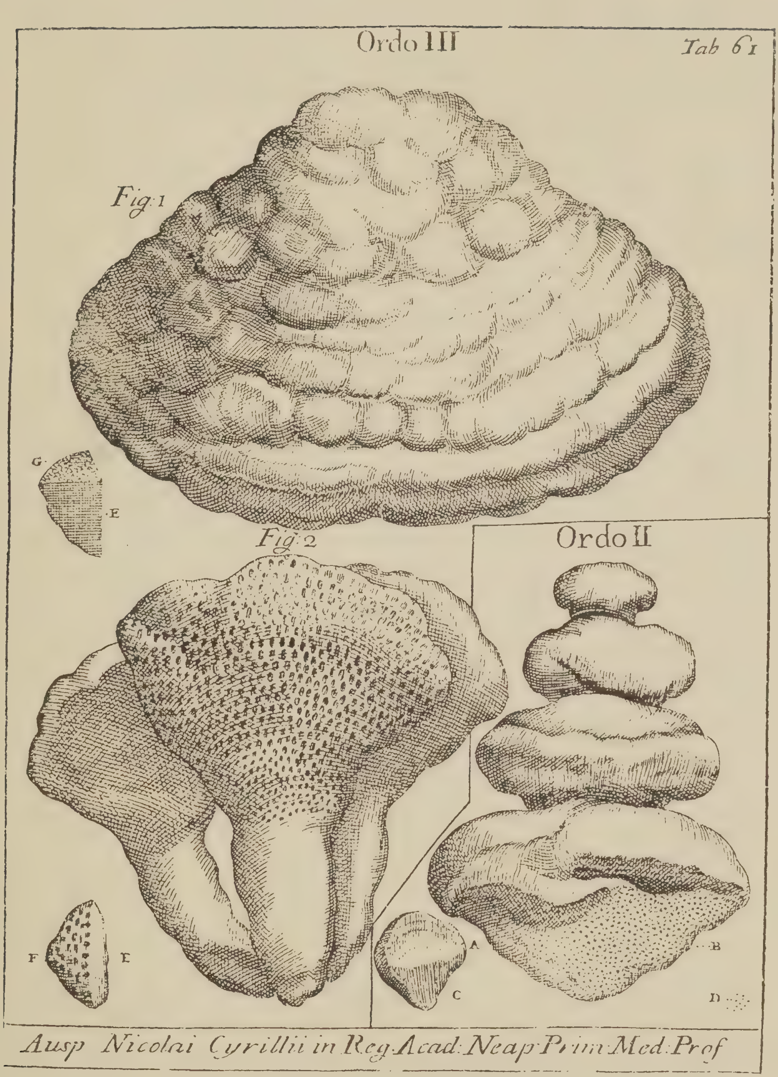
Ordo III
Tab 61
Fig. 1
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Fig. 2
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Fig. 1. Type species of Poria Adans. (Fig.2-Ordo III). From Micheli 1729, plate 61.

Acknowledgements.

Dr. L. Holm, Univ. of Uppsala, Sweden, has suggested improvements in the text and otherwise been helpful, for which I am very grateful.

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MYCOTAXON

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NEW SPECIES OF STIPITATE HYDNUMS FROM SOUTHEASTERN UNITED STATES AND MEXICO

Richard E. Baird[1]

Department of Botany
The University of Tennessee
Knoxville, TN 37996-1100

ABSTRACT

From herbarium collections, four new species of stipitate hydnums are described from the southeastern United States and Mexico. The new species are Phellodon excentri-mexicana, Phellodon radicatus, Sarcodon excentricus, and Sarcodon harrisonii. Macromorphological and micromorphological characters and results from macrochemical tests of the basidiocarps are included in the species descriptions.

INTRODUCTION

General collections of stipitate hydnums from TENN and FLAS were examined during a study of the group from the southern Appalachian Mountains. From the herbarium material, several collections were found to be distinct from any aforementioned taxon and represented undescribed taxa. In addition, S. excentricus previously described as new was not properly validated (Coker and Beers,1951) and thus a Latin description is provided here for the taxon.

The dried sporophores were analyzed using the methods developed by Maas Geesteranus (1971) and Harrison (1973). Color standards are from Ridgway (1912) and Kornerup and Wanscher (1978). The Ridgway names are in parentheses with quotation marks and the first letter capitalized; the Kornerup and Wanscher names are always followed by coordinates contained in parenthesis. All macrochemical tests used 8% aqueous potassium hydroxide (KOH) or 25% aqueous ammonium hydroxide (NH_4OH).

For each character observed, the exact numbers of measurements are listed after each structure; for example, Basidia: (n=20). In all cases, the abbreviation X= refers to the mean numerical value for the measured character.

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[1] Present address: Department of Botany, University of Florida, Gainesville, FL 32611.

RESULTS AND DISCUSSION

Phellodon excentri-mexicana Baird. *sp. nov.* Figs. 1, 2.

Pileus concrescens, depressus ad infundibuliform; margine irregularis, lobis. Stipe excentric, concrescens aut saepe destitutus. Referre ad descriptio infra per structura mensio.

Type specimen (HOLOTYPE): Mexico: Near Pachuca, Hidalgo. 1.X.1944. Coll. A. J. Sharp no. 18319 (TENN).

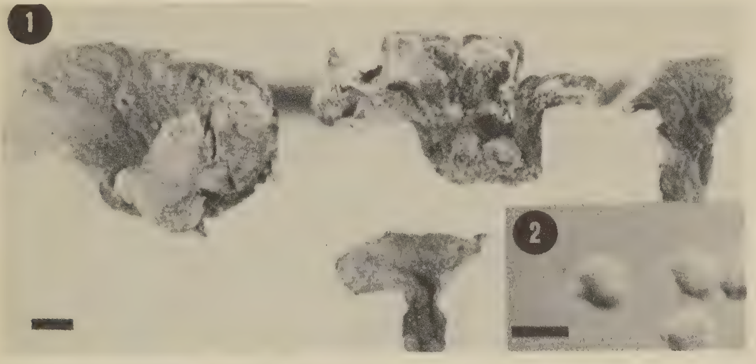
MACROMORPHOLOGY (preserved material): SPOROPHORE: *Pileus*: up to 7.0 cm broad, highly concrescent, depressed to infundibuliform, spongy tomentose to matted or glabrous, often pitted from collapsing tomentum, rugose to rarely plicate, with faint concentric corrugations or zones, subscrobiculate to smooth on disc, uneven to lobed at margin, light yellow (4A4) nearest the margin, red-haired (6C4) to dark brown (7F4) or black where weathered; context up to 5.0 mm thick, duplex to homogeneous, zonate, flesh (6B3) to greyish orange (6B4); taste none; odor fragrant. *Stipe*: up to 2.0 x 1.5 cm, lacking or eccentric, thick, stout, terete to attenuate below or with bulbous base, spongy tomentose below to matted or glabrous above, concolorous with pileus, or with patches of light orange (5A5) present nearest the base; context not duplex, zonate, concolorous with pileus flesh. *Spines*: up to 2.0 mm long, decurrent to a line, crowded, cream (4A3) to flesh (6B3) colored. CHEMICAL REACTIONS: preserved context tissue olive green to brown in KOH or NH_4OH.

MICROMORPHOLOGY (preserved material): *Pileus trama hyphae*: up to 8.0 μm diam., uninflated, hyaline, interwoven in subsurface layer, parallel below, no clamps seen; gloeoplerous-like generative hyphae present. *Stipe hyphae*: up to 6.4 μm diam., uninflated, hyaline, interwoven in subsurface layer, parallel below, no clamps seen; gloeoplerous-like (lactiferous) generative hyphae absent. *Spine trama hyphae*: up to 4.5 μm diam., no clamps seen. *Basidia*: (n=20) 36.0-49.6 x 5.6-6.4 (7.2) μm (X= 43.92 ± 4.39 x 6.07 ± 0.57 μm), clavate, unclamped, 4-spored; sterigmata (n=10) 3.2-4.0 μm long (X= 3.84 ± 0.26 μm).

Basidiospores: (n=20) 4.8-5.6 x 4.0-4.8 μm (X= 5.16 ± 0.39 x 4.36 ± 0.35 μm), subglobose, hyaline; ornamentation prominently echinulate; hilar appendage oblique.

DISCUSSION: This species can be confused with *Phellodon fibulatus* Harrison, which occurs in the southern Appalachian Mountains. The color of the sporophores is somewhat similar, the spore size and shapes are almost identical, and both species may be found in deciduous woods. However, several major differences separate the two taxa: 1) *Phellodon fibulatus* has abundant clamp connections, absent in *P. excentri-mexicana*; and 2) the stipe of *P. excentri-mexicana* are always obviously eccentric causing the pileus to appear spathulate, unlike the stipe of *P*. *fibulatus* which is more central.

Phellodon *confluens* (Pers.) Pouzar may also be confused with *P*. *excentri*-*mexicana* because of their similar basidiocarp macromorphology. Color differences are evident, however, with the sporophores of *P*. *confluens* ranging from creamy buff to grayish or gray buff to some shade of brown. In particular, the yellowish margin of *P*. *excentri*-*mexicana* is never present in *P*. *confluens*. Also, the spores of *P*. *confluens* are smaller (3.5- x 3.0-4.0 μm) than those of *P*. *excentri*-*mexicana*.



Figs. 1-2: *P*. *excentri*-*mexicana*: Fig. 1- sporophores with bar scale equal to 1 cm. Fig. 2- spores with bar scale equal to 5 μm.

Phellodon *radicatus* Baird. *sp*. *nov*. Figs. 3, 4.

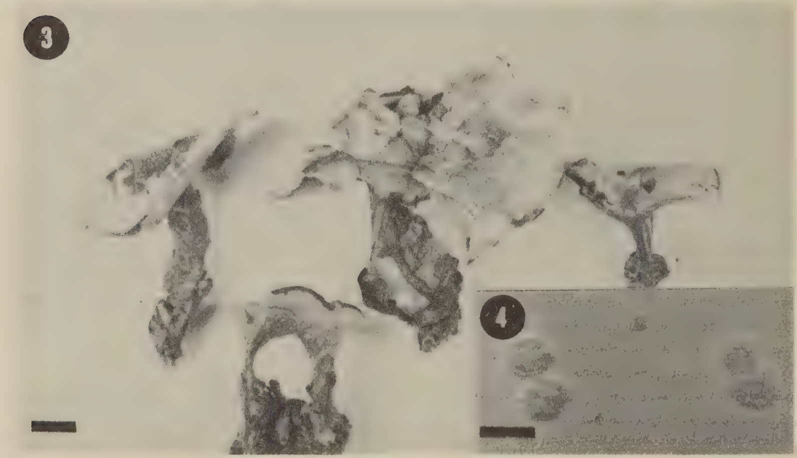
Pileus concrescens, planum ad depressus, margine etiam, obtusus; stipe centralis, radicatus, concrescens aut saepe destitutus. Referre ad descriptio infra per structura mensio.

Type specimen (HOLOTYPE): USA: Florida, Gainesville. 23.VIII.1978. Coll. A. E. Logand no. 54347 (FLAS).

MACROMORPHOLOGY (preserved material): SPOROPHORE: *Pileus*: up to 4.0 cm broad, single to concrescent, plane to depressed, generally smooth, tomentose to matted or glabrous; margin even, blunt; yellowish white (4A2), sand (4B3) to golden blonde (5C4) or sunburn (6D5), often with blackish weathered areas; context up to 8.0 mm thick, homogeneous, zonate, grayish orange (5B4) to brownish orange (5C3); taste none; odor of maple syrup. *Stipe*: up to 2.0 x 0.9 cm, central, tomentose, matted or glabrous above, attenuate below to radicating base, concolorous; context duplex towards the base, zonate, concolorous with pileus flesh. *Spines*: up to 2.0 mm long, decurrent to a line, crowded, cream (4A3) on the margin to yellowish white (4A2) with cream (4A3) tips. CHEMICAL REACTIONS: preserved context tissue slightly olivaceous in KOH or NH_4OH.

MICROMORPHOLOGY (preserved material): *Pileus trama hyphae*: up to 6.4 µm diam., uninflated, hyaline, interwoven in subsurface layer, parallel below, no clamps seen; gloeoplerous-like generative hyphae present. *Stipe hyphae*: up to 7.2 µm diam., uninflated, interwoven in subsurface layer, parallel below, no clamps seen ; gloeoplerous-like hyphae present. *Stipe trama hyphae*: up to 5.6 µm diam., no clamps seen. *Basidia*: (n=20) 28.0-40.0 x (5.8) 6.4-8.8 (9.6) µm (X= 33.52 ± 4.41 x 7.30 ± 1.25 µm), clavate, unclamped, 4-spored; sterigmata (n=10) 3.2-4.0 µm long (X= 3.84 ± 0.26 µm).

Basidiospores: (n=20) (4.0) 4.8-5.6 x (3.2) 4.0-4.8 µm (X= 5.04 ± 0.52 x 4.32 ± 0.54 µm), subglobose to globose, hyaline; ornamentation echinulate; hilar appendage oblique.



Figs. 3-4: *P. radicatus*: Fig. 3- sporophores with bar scale equal to 1 cm. Fig. 4- spores with bar scale equal to 5 µm.

DISCUSSION: Sporophores of *Phellodon radicatus* are similar to those of *Phellodon confluens*, but can be distinguished as follows: 1) basidiospores of *P. radicatus* are almost 1.0 µm larger than the spores of *P. confluens* (3.5-4.5 x 3.0-4.0); 2) the pileus context in *P. radicatus* is never duplex as in *P. confluens*; 3) sporophores of *P. confluens* are white (9A1) to reddish gray (9B2) to brownish gray (9C2) which differs from the colors in the above description; and 4) *Phellodon radicatus* has been found only in Florida and *P. confluens* occurs throughout the eastern United States and in Canada, but has not been found in Florida.
SPECIMENS EXAMINED: FLAS 53470 (Type); FLAS 45379 (*Hydnum amicum*).

Sarcodon *excentricus* Coker and Beers *apud* Baird. *sp*. *nov*.
Figs. 5, 6.

[≡ *Sarcodon* *excentricus* Coker and Beers. 1951.
Stip. Hydn. East. U.S. p. 51. *nom*. *nudum*.]

Pileus subroseus brunneus, coriaceus, laevis; stipe plerumque excentricus, concolorous, albidus tomentosus basi, scabridus ad laevis; spina subdistans, brunneus, maxime decurrens. Referre ad discriptio infra per structura mensio.

Type specimen (HOLOTYPE): USA: Tennessee, Cades Cove, 17.X.1937. Coll. L. R. Hesler no. 10921 (TENN).

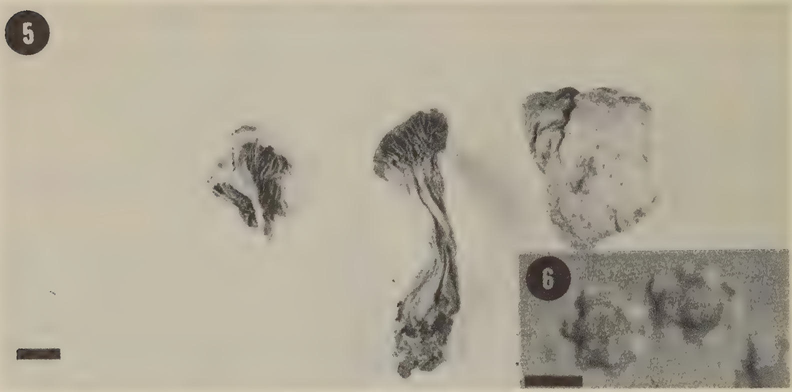
MACROMORPHOLOGY (preserved material): SPOROPHORE: *Pileus*: up to 6.0 cm broad, convex to plane or subdepressed, pubescent, later glabrous, smooth, leathery surface, rarely rimose, orange white (5A2), grayish orange (5B3-5B4), pale red (7A3) to light brown (7D5) or with spots of somalia (7E5) ("Fawn" to "Light Pinkish Cinnamon" *teste* Hesler); context up to 1.0 cm thick, not duplex, azonate, about grayish orange (5B3-5B4); taste salty or bitter; odor none. *Stipe*: up to 6.0 x 1.5 cm, subcentral, usually eccentric, attenuate upwards, glabrous or smooth, concolorous with pileus, white tomentum at the base, context not duplex, azonate, solid to hollow, concolorous flesh. *Spines:* up to 1.0 cm long, decurrent, subdistant, easily breaking off at their bases causing a scabrous surface, somalia (7E5). CHEMICAL REACTIONS: preserved context tissue olivaceous to brown in KOH or NH_4OH.

MICROMORPHOLOGY (preserved material): *Pileus* *trama* *hyphae*: up to 12.6 μm diam., inflated, parallel in leathery surface layer, interwoven below, clamped; gloeoplerous-like hyphae absent. *Stipe* *hyphae*: up to 13.0 μm diam., inflated, interwoven throughout the context, clamped; gloeoplerous-like hyphae absent. *Spine* *trama* *hyphae*: up to 10.0 μm diam., uninflated to inflated, clamped. *Basidia*: (n=20) 30.0-45.0 x (5.0) 6.0-7.5 (8.0) μm (X= 35.97 ± 4.40 x 6.50 ± 0.87 μm), clavate, clamped 4-spored; sterigmata (n=10) 4.5-6.0 μm long (X= 5.08 ± 0.42 μm).

Basidiospores: (n=20) (6.5) 7.0-8.0 (8.5) x (6.0) 6.5-7.5 (8.0) μm (X= 7.55 ± 0.53 x 6.96 ± 0.59 μm), subglobose, brownish; ornamentation prominently tuberculate, flattened to exsculpate; hilar appendage oblique.

DISCUSSION: Coker and Beers failed to provide a Latin description for this species. The name designated by those authors is considered a *nomen* *nudum*, therefore. *Sarcodon* *excentricus* might be confused with *Sarcodon* *scabripes*, but, the context of the latter turns olivaceous when dried. The tissue of *S*. *excentricus* has a disagreeable or slightly salty taste from dried sporophores that is lacking in *S*. *scabripes*. Moreover, the dry

basidiocarps of *S. excentricus* have a pinkish brown tint absent in *S. scabripes*.
SPECIMENS EXAMINED: TENN 10921 (Type); NCU 10990; NCU 12777; TENN 19414.



Figs. 5-6: *S. excentricus*: Fig. 5- sporophores with bar scale equal to 1 cm. Fig. 6- spores with bar scale equal to 5 µm.

Sarcodon harrisonii Baird. *sp. nov.* Figs. 4, 8.

Pileus rimosus non squamosus, castaneous; stipe brevis, obtusus basis, concolorous quam pileus; spina brevi, non decurrens, concolorous quam pileus. Referre ad descriptio infra per structura mensio.

Type specimen (HOLOTYPE): USA: North Carolina, Near Asheville, 5.X.1981. Coll. A. Stanley no. 44064 (TENN).

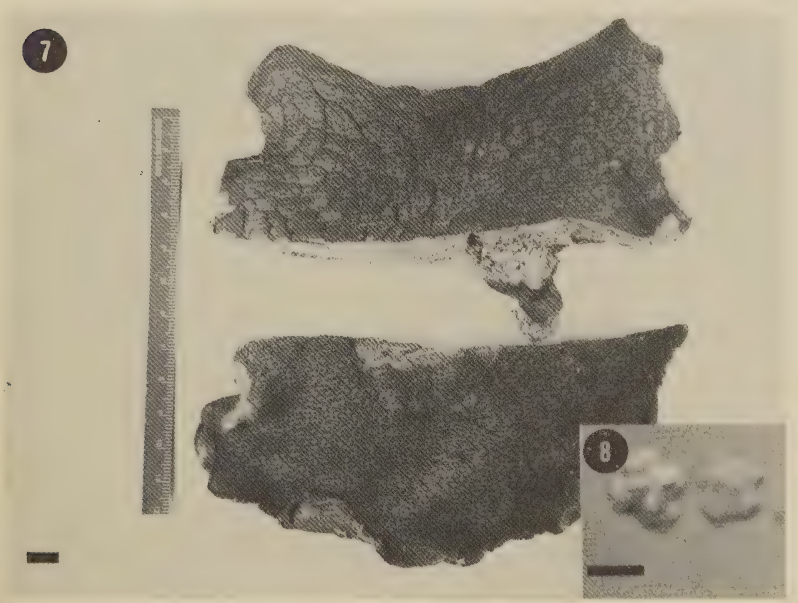
MACROMORPHOLOGY (preserved material): SPOROPHORE: *Pileus*: up to 17.0 cm broad, plane to depressed, somewhat irregular, pubescent at the margin, soon becoming glabrous, almost immediately shallow rimose becoming much deeper towards the disc, rarely exposing the inner context, areolate, leathery surface, reddish brown (8E4) to dark brown (8F4) or dark brown (9F4) with brownish orange (7C5) in the fissures; context up to 3.0 cm thick, not duplex, azonate, brittle, orange white (5A2), grayish orange (5B3) to birch bark (6B2) after drying; taste none; odor slightly fragrant. *Stipe*: up to 3.0 x 1.5 cm, central to subcentral, terete or subattenuate below to a blunt base, pubescent to glabrous, concolorous with pileus; context not duplex, azonate, concolorous with pileus flesh. *Spines*: up to 1.0 cm long, not decurrent, crowded, light orange (7D4) to reddish brown (8E4) or dark brown (8F4). CHEMICAL REACTIONS: preserved context tissue olivaceous in KOH or NH_4OH.

MICROMORPHOLOGY: *Pileus trama hyphae*: up to 12.0 µm diam., inflated, interwoven throughout the context, clamped; gloeoplerous-like hyphae up to 8.0 µm diam. *Stipe hyphae*: up to 15.0 µm diam., inflated, interwoven throughout the context, clamped; gloeoplerous-like hyphae up to 7.5 µm diam. *Spine trama hyphae*: up to 11.0 µm diam., uninflated to inflated, clamped. *Basidia*: (n=20) (25.0) 30.0-40.0 x (6.0) 6.5-8.0 µm (X= 32.75 ± 4.78 x 7.10 ± 0.78 µm), clavate, clamped, 4-spored; sterigmata up to 5.0-6.0 µm long (X= 5.33 ± 0.33 µm).

Basidiospores: (n=20) 7.0-8.0 x (5.5) 6.0-7.5 µm (X= 7.44 ± 0.42 x 6.58 ± 0.65 µm), subglobose, brownish; ornamentation tuberculate, prominent, flattened to exasculpate; hilar appendage oblique.

DISCUSSION: This species is very similar to *Sarcodon ustale* Harrison, reported from northern Michigan (Smith and Smith, 1973). Pilei in the latter species are never deeply rimose, the context is light brown to pallid and the spines are longer and more distant. *Sarcodon harrisonii* may also be confused with *S. imbricatus*, but the former does not show an imbricate scaly surface, nor does the pileus become smooth in age as it does in the southern forms of *S. imbricatus*.

This species is named after Dr. Kenneth Harrison the North American expert on the stipitate hydnums. From his publications, professional and amateur mycologists can more easily identify the taxa of the group.



Figs. 7-8: *S. harrisonii*: Fig. 7- sporophores with bar scale equal to 1 cm. Fig. 8- spores with bar scale equal to 5 µm.

ACKNOWLEDGEMENTS

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MYCOTAXON

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NEW OR INTERESTING MICROFUNGI

XIV. DEMATIACEOUS HYPHOMYCETES FROM MT KENYA

BY P. M. KIRK

Commonwealth Mycological Institute, Ferry Lane, Kew,
Richmond, Surrey TW9 3AF, U.K.

SUMMARY

Descriptions and illustrations of the following dematiaceous hyphomycetes collected on Mt Kenya are presented; *Acremoniula brevis* (M.B. Ellis) S. Hughes, *Bactrodesmium curvatum* P.M. Kirk sp.nov., *Balaniopsis* P.M. Kirk gen.nov. with *B. africana* (Kiffer) P.M. Kirk comb.nov., *Berkleasmium caribense* Hol.-Jech. & Mercado, *Berkleasmium pulchrum* Hol.-Jech. & Mercado, *Chaetopsina keniensis* P.M. Kirk sp.nov., *Chaetopsina unilateralis* P.M. Kirk sp.nov., *Chaetopsina ramifera* Matsushima, *Chalara phaeospora* P.M. Kirk sp.nov., *Dischloridium keniense* P.M. Kirk sp.nov., *Endophragmiella naromoruensis* P.M. Kirk sp.nov., *Endophragmiella rostrata* P.M. Kirk sp.nov., *Exserticlava triseptata* (Matsushima) S. Hughes, *Janetia longispora* P.M. Kirk sp.nov., *Menispora britannica* (M.B. Ellis) P.M. Kirk comb.nov., *Phaeoisaria infrafertilis* B. Sutton & Hodges, *Phialocephala foliicola* P.M. Kirk sp.nov., *Sporidesmium brachypus* (Ell. & Ev.) S. Hughes, *Sporidesmium doliiforme* Minter & Hol.-Jech., *Subulispora cylindrospora* P.M. Kirk sp.nov., *Subulispora elegantissima* P.M. Kirk sp. nov., *Subulispora procurvata* Tubaki, *Teratosperma microspora* P.M. Kirk sp.nov., *Uberispora simplex* (Ichinoe) Pirozynski & Hodges, *Zanclospora brevispora* S. Hughes & Kendrick.

INTRODUCTION

The following twenty-five dematiaceous hyphomycetes are a selection from over 100 species which were recorded from material, mainly leaf litter, collected during a short visit to the south and west faces of Mt Kenya. Accounts of the other species recorded will be presented elsewhere.

TAXONOMIC PART

ACREMONIULA BREVIS (M.B. Ellis) S. Hughes, *N.Z. Jl Bot.* **17**: 165 (1979). (Fig. 1A)
Endophragmia brevis M.B. Ellis, *Mycol. Pap.* **131**: 11 (1972).

Colonies effuse, granular, blackish-brown to black, inconspicuous. *Mycelium* partly immersed in the substratum but mostly superficial, composed of branched, septate, smooth, brown hyphae 2–3 μm wide. *Conidiophores* micronematous or semi-macronematous, mononematous, erect or recumbent, solitary or arising in groups of 2–4, simple, hyaline to very pale brown, smooth, becoming septate, up to 28 μm high, 4–4.5 μm wide. *Conidiogenous cells* integrated, terminal, determinate. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* presumably schizolytic. *Proliferation* not clearly observed, presumably enteroblastic sympodial. *Conidia* initially solitary and acrogenous, later acropleurogenous, broadly obovoid with the base abruptly truncate, (1–) 2-euseptate, brown to dark brown, with the basal cells hyaline to very pale brown, 12–18 μm long, 10–14 μm wide, 4–4.5 μm wide at the base.

Specimen examined: On dead leaf of *Ocotea usambarensis* Engl., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1357a, IMI 285126a.

Ellis (1972) described *Endophragmia brevis* M.B. Ellis from leaves of *Eugenia zuluensis* Dümmer collected in South Africa. It was found to be associated with *Asterina natalitia* Doidge and *Echidnodes natalensis* (Doidge) Doidge. The present collection agrees with the holotype in all respects except it does not appear to be associated with any other fungi. Hughes (1979) considered *Endophragmia* Duvernoy & Maire (1920) to be a nomen confusum and referred the majority of species to *Endophragmiella* B. Sutton (1973) based, essentially, on the mode of regeneration of the conidiogenous cells. *Endophragmia brevis* did not exhibit this characteristic but showed closer affinities with *Acremoniula sarcinellae* (Pat. & Hariot) Arnaud ex Deighton, also a hyperparasite, and was subsequently transferred to *Acremoniula*. The present collection would appear to represent the first record of this species since its description.
Illustrations: Ellis (1972, 1976, as *Endophragmia brevis*), Hughes (1979).

BACTRODESMIUM CURVATUM P.M. Kirk, sp. nov. (Fig. 1B)

Sporodochia dispersa, puctiformia, pulvinata, atra, nitida. Mycelium in substrato immersum, ex hyphis ramosis, septatis, laevibus, pallide brunneis, 1.5–2.5 μm latis compositum. Conidiophora micronemata vel semi-macrone-

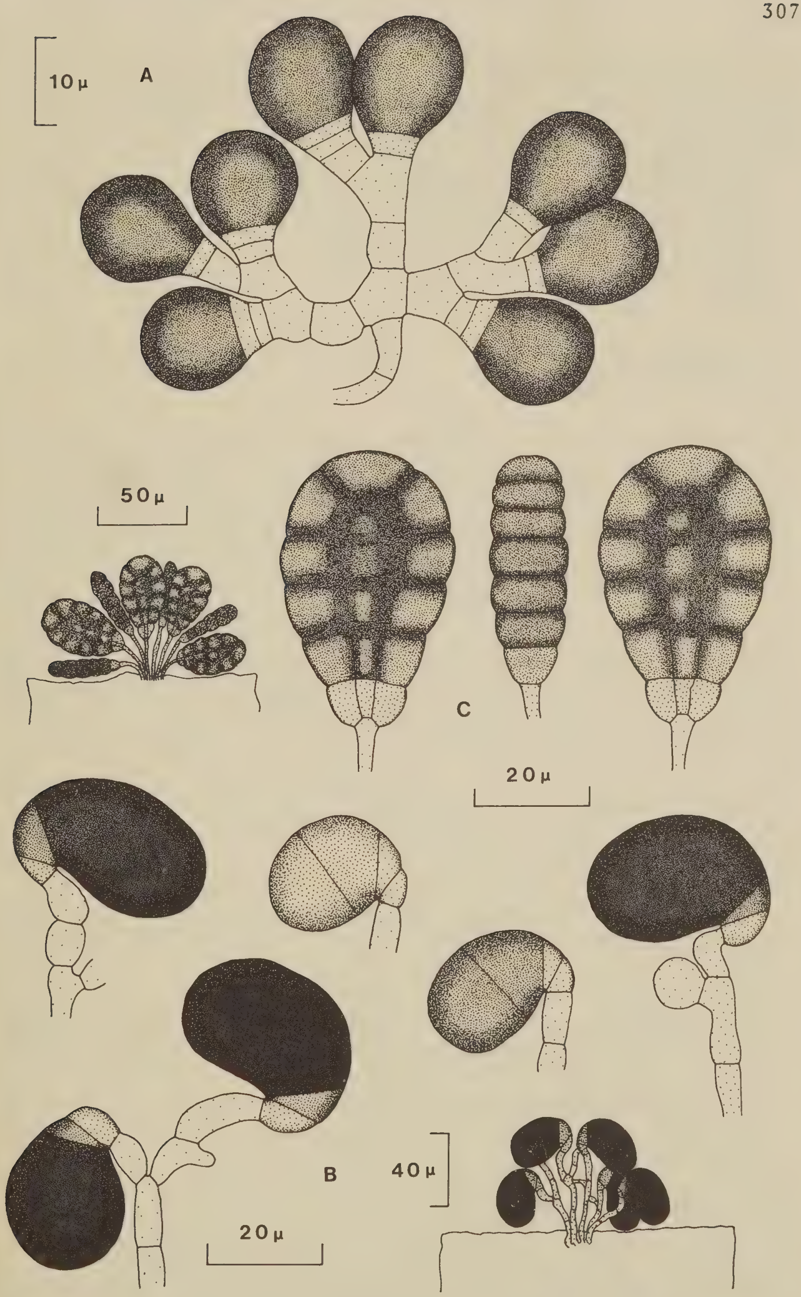

10μ
A
50μ
C
20μ
20μ
B
40μ

Fig. 1. (A) *Acremoniula brevis* (P.M. Kirk 1357a). (B) *Bactrodesmium curvatum* (Holotype). (C) *Berkleasmium pulchrum* (P.M. Kirk 1593a).

mata, mononemata, fasciculata, plerumque ramosa, hyalina ad pallidissima brunnea, laevia, septata, usque ad 45 (–60) μm alta, 4–6 μm lata. Cellulae conidiogenae in conidiophoris incorporatae, terminales, determinatae. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio rhexolytica. Proliferatio non visu. Conidia acrogena, solitaria, subglobosa ad late pyriformia, inferiore in parte abrupte curvata, 3-euseptata, laevia, brunnea ad atrobrunnea, septo superiore ob cellulam apicalem brunneo-nigram obscuro, 24–32 μm longa, in partem maximam 14–20 μm lata.

In caulibus emortuis *Arundinariae alpinae* Schumann, P.M. Kirk 1359a, IMI 284762a, holotypus.

Sporodochia scattered, punctiform, pulvinate, black, shining. *Mycelium* immersed in the substratum, composed of branched, septate, smooth, pale brown hyphae 1.5–2.5 μm wide. *Conidiophores* micronematous, or semi-macronematous, mononematous, fasciculate, mostly branched, hyaline to very pale brown, smooth, septate, up to 45(–60) μm high, 4–6 μm wide. *Conidiogenous cells* integrated, terminal, determinate. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* rhexolytic. *Proliferation* not observed. *Conidia* acrogenous, solitary, subglobose to broadly pyriform, proximally abruptly curved, 3-euseptate, smooth, brown to dark brown, blackish brown in the terminal cells and thus obscuring the distal septum, 24–32 μm long, 14–20 μm wide in the broadest part.

Specimens examined: On dead stems of *Arundinaria alpina*, Naro Moru track, Mt Kenya, Kenya, 22 Jan. 1984, P.M. Kirk 1356c, 1359a, 1377e, IMI 284759c, 284762a, holotype, 284780e.

The abrupt curvature of the basal cells of the conidia in *Bactrodesmium curvatum* is similar to that in the conidia of *B. obliquum* B. Sutton (1967), *B. obliquum* var. *suttonii* S. Hughes & White (1983) and, to a lesser extent, *B. papyricola* C. & M. Moreau ex M.B. Ellis (Ellis, 1959) and *B. cedricola* M.B. Ellis (1959). It differs from these species in the number and arrangement of the septa. Pigmentation of the conidia in *B. curvatum* is similar to that found in *B. microleucurum* (Speg.) M.B. Ellis (1965) and *B. atrum* M.B. Ellis (1959) where the distal septa are completely obscured at maturity.

BALANIOPSIS P.M. Kirk, gen.nov.

Mycelium partim superficiale sed in substrato plerumque immersum, ex hyphis ramosis, septatis, laevibus, pallide brunneis ad brunneis compositum. Conidiophora macronemata, mononemata, solitaria, erecta, simplicia, recta vel leviter flexuosa, laevia, sepata, brunnea ad atrobrunnea, ad apicem pallidiora, per proliferationes percurrentes crescentia. Cellulae conidiogenae in conidiophoris incorporatae, terminales, percurrentes. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio forsitan synchrona. Conidiorum secessio rhexolytica, fracta ab cellula intercalari. Proliferatio fractas per partes cellulae intercalaris a cellula adjacenti. Conidia acrogena, in ramulis brevi-catenatis, laevia, sicca, brunnea ad atrobrunnea, subglobosa ad late ellipsoidea vel obovata, non-septata, a cellula brevi intercalari delimitata.

Sp. typ. *B. africana* (Kiffer) P.M. Kirk

Mycelium partly superficial but mostly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae. *Conidiophores* macronematous, mononematous, solitary, erect, simple, straight or slightly flexuous, smooth, septate, brown to dark brown, paler towards the apex, with percurrent proliferations. *Conidiogenous cells* integrated, terminal, percurrent. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* presumably synchronous with conidial ontogeny. *Conidial secession* rhexolytic by fracture of a separating cell. *Proliferation* through the remains of the proximal separating cell from the cell immediately below. *Conidia* acrogenous, in short branched chains, smooth, dry, brown to dark brown, subglobose to broadly ellipsoid or obovate, non-septate, delimited by short separating cells.

The combination of rhexolytic conidium secession, conidia in short branched chains and unbranched macronematous conidiophores which exhibit percurrent regeneration is unknown in any other genus of hyphomycetes. This unique combination of characteristics distinguishes *Balaniopsis* from superficially similar genera such as *Balanium* (Ellis, 1961; Hughes & Hennebert, 1961), *Lobatopedis* (Kirk, 1979, 1982d) and *Sporophiala* (Kirk, 1982c).

BALANIOPSIS AFRICANA (Kiffer) P.M. Kirk, comb.nov. (Fig. 2A)
Balanium africanum Kiffer, *Naturaliste can.* **100**: 261 (1973).

Colonies effuse, hairy, blackish brown to black. *Mycelium* partly superficial but mostly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 2–5 μm wide. *Conidiophores* macronematous, mononematous, solitary, erect, simple, straight or slightly flexuous, smooth, septate, brown to dark brown, paler towards the apex, 100-160 (–200) μm high, 5–8 (–9) μm wide, with 1–4 cylindrical to lageniform percurrent proliferations 8–22 μm long. *Conidiogenous cells* integrated, terminal, percurrent. *Conidial ontogeny* holoblastic by apical wall

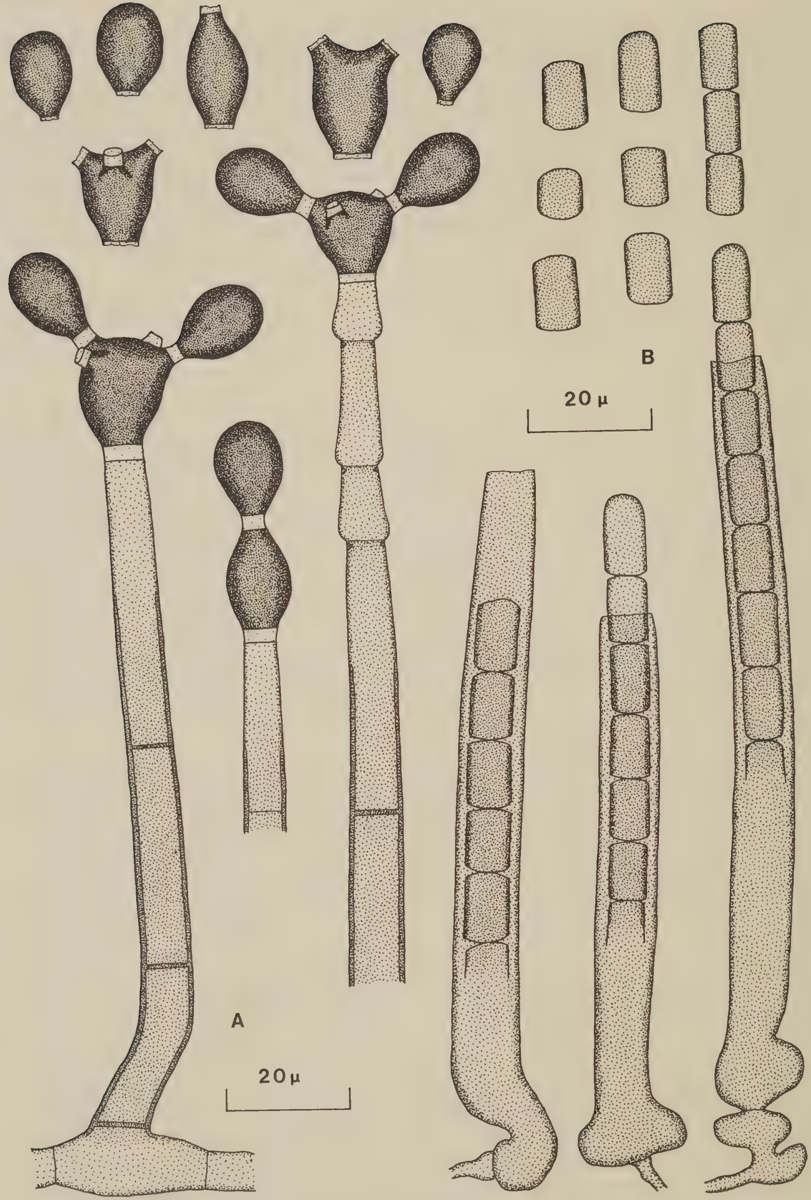


Fig. 2. (A) *Balaniopsis africana* (P.M. Kirk 1587). (B) *Chalara phaeospora* (Holotype).

building. *Conidial maturation* presumably synchronous with conidial ontogeny. *Conidial secession* rhexolytic by fracture of a separating cell. *Proliferation* through the remains of the proximal separating cell from the cell immediately below. *Conidia* acrogenous, smooth, brown to dark brown, non-septate, delimited by short separating cells and seceeding rhexolytically, in short branched chains, the basal, broadly ellipsoid to somewhat subglobose conidium 14–20 μm long, (10–) 12–16 μm wide, bearing at or around its apex 1–5 broadly ellipsoid to obovate terminal conidia 12–18 μm long, 9–12 μm wide.

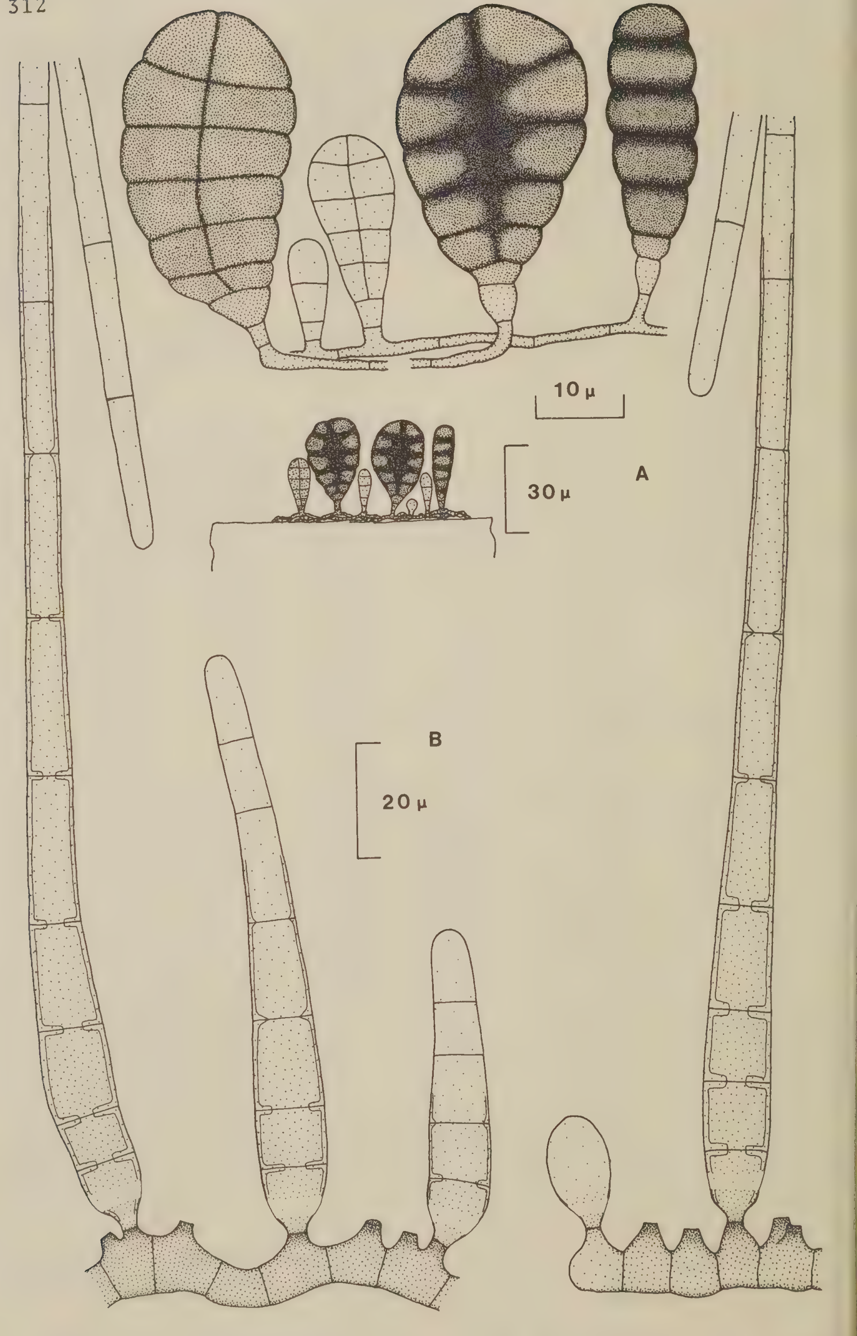
Specimen examined: On dead frond stalk of *Cyathea* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1587, IMI 285443.

Kiffer (1973) described *Balanium africanum* Kiffer from an isolate obtained from soil originating in Zaire. Although there are some differences between the description of the holotype and the collection on *Cyathea* sp. described above it appears that these are entirely due to the fact that the holotype was described from pure culture and the present material is on the 'natural' substratum. The species has not been reported since its original description.

BERKLEASMIUM CARIBENSE Hol.-Jech. & Mercado, *Ceska Mykol.* 38: 99 (1984). (Fig. 3A)

Sporodochia punctiform to effuse, granular, black. *Mycelium* partly superficial, partly immersed in the substratum, composed of pale brown to brown, smooth, branched, septate hyphae 1.5–3 μm wide bearing the conidiophores terminally and laterally or intercalary. *Conidiophores* micronematous, mononematous, solitary or fasciculate, erect or ascending, simple, septate, hyaline to very pale brown, smooth, up to 10 μm high, 2–4 μm wide. *Conidiogenous cells* integrated, terminal, determinate. *Conidial ontogeny* holoblastic by apical and effuse wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* not observed, presumably rhexolytic by fractures of the wall below the conidium delimiting septum. *Proliferation* not observed. *Conidia* acrogenous, solitary, broadly obclavate to obpyriform in face view, ellipsoid to obclavate in lateral view, septate, with a single longitudinal septum and 5–6 transverse septa, constricted at the septa, pale brown to brown or dark brown with the pigmentation concentrated around the septa, especially the distal septa, smooth, 24–36 μm long, 16–22 μm wide, 8–12 μm thick.

Specimen examined: On dead stem of *Arundinaria alpina*, Naro Moru track, Mt Kenya, Kenya, 22 Jan. 1984, P.M. Kirk 1389a, IMI 284792a.


10 μ
30 μ
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B
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Fig. 3. (A) *Berkleasmium caribense* (P.M. Kirk 1389a). (B) *Janetia longispora* (Holotype).

Berkleasmium caribense Hol.-Jech. & Mercado is probably not closely related to *B. concinnum* (Berk.) S. Hughes (1958), the type species of *Berkleasmium*, or to the other species presently referred to this genus. In the collection from Kenya described above the colonies are sporodochial and punctiform or, more frequently, effuse and as such resemble the colonies formed by species of, for example, *Cryptocoryneum, Dictyosporium* or *Oncopodium*. A new genus will probably be required for *B. caribense* when further collections are available for study.

Illustrations: Holubová-Jechová & Mercado (1984).

BERKLEASMIUM PULCHRUM Hol.-Jech. & Mercado, *Ceska Mykol.* 38: 101 (1984). (Fig. 1C)

Sporodochia punctiform, pulvinate, black, 100–140 µm diam. *Mycelium* immersed in the substratum, composed of branched, septate, smooth, pale brown hyphae 2–3 µm wide. *Conidiophores* micronematous or semi-macronematous, mononematous, fasciculate, simple or sometimes branched, septate, hyaline to very pale brown, smooth, up to 25 µm high, 2–4 µm wide. *Conidiogenous cells* integrated, terminal, determinate. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* presumably synchronous with conidial ontogeny. *Conidial secession* rhexolytic. *Proliferation* not observed. *Conidia* acrogenous, solitary, broadly ellipsoid to pyriform in face view, ellipsoid to somewhat clavate in lateral view, muriform, smooth, reddish-brown to dark brown, very dark brown around the septa, 36–52 µm long, 24–31 µm wide, 14–17 µm thick.

Specimen examined: On rotten wood, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1593a, IMI 285428a.

Berkleasmium pulchrum Hol.-Jech. & Mercado appears closer to *B. leonense* M.B. Ellis (1976), on dead branches of *Ficus* sp. from Sierra Leone, and *B. tropicale* Morris (1972), on dead wood from Costa Rica, than to the type species, *B. concinnum*, on rotten wood from N. America and Europe. In the two former species the conidia are flattened, comprising a single layer of three columns of regularly arranged cells, whereas in the latter species they are distinctly cylindrical, with the cells somewhat randomly arranged. It is questionable, therefore, whether *B. pulchrum*, *B. leonense* and *B. tropicale* are correctly placed in *Berkleasmium* since the conidia are probably unlike those of *B. concinnum* developmentally. For the present, however, the sporodochial nature of the conidioma, the muriform conidia and the lignicolous habitat unite these species and there seems little justification in introducing a new genus for them.

Illustrations: Holubová-Jechová & Mercado (1984).

CHAETOPSINA KENIENSIS P.M. Kirk, sp.nov. (Fig. 4A)

Coloniae effusae, pilosae, brunneae, saepe inconspicuae. Mycelium partim superficiale, partim in substrato immersum, ex hyphis ramosis, laevibus, septatis, pallide brunneis, 2–5 μm latis compositum. Conidiophora macronemata, mononemata, solitaria, erecta, e duobus partibus compositum: interior est recta vel leviter curvata, laevis, septata, brunnea vel atrobrunnea, subulata et setiformis, 200–260 μm alta, 7–9 μm lata super fundamento nonnihil radialiter lobato 20–30 μm lato; exterior habet 9–20 (–26) ramulos curvatos 50–120 μm longos, 3–7 μm latos, laeves, septatos, pallide brunneos vel brunneos ad atrobrunneos, subulatos et setiformes e quibus exoriuntur seriatim ramulti alteri perquam pallide brunnei cellulas ferentes conidiogenas. Cellulae conidiogenae discretae, cylindricae ad interdum lageniformes, determinatae, ad apicem interdum collaretta minuta saepe indistincta quaeque induta. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio schizolytica. Proliferatio enteroblastica sine progressione sed cum regione incrassata periclinali. Conidia acronogena, solitaria, in guttula liquida accumulatia quae statu sicco regionem fingit albam a ramulis conidiophori inclusam, cylindrica ad late fusiformia, ad apicem acuta, ad fundamentum truncata cicatrice plana nil incrassata 0.8–1.2 μm lata induta, leviter curvata, utrinque setula singula 5–7 μm longa praedita, setula apicali in termino inventa et setula inferiore e cicatricis marginem orienti concavo in lato conidii, hyalina, laevia, non-septata, 2–4 guttulata, (11–) 12–16 μm longa, 1.5–2.5 μm lata.

In folio arboris ignotae, P.M. Kirk 1506a, IMI 285174a, holotypus.

Colonies effuse, hairy, brown, often inconspicuous. *Mycelium* partly superficial, partly immersed in the substratum, composed of branched, smooth, septate, pale brown to brown hyphae 2–5 μm wide. *Conidiophores* macronematous, mononematous, solitary, erect, comprising a straight or usually slightly curved, smooth, septate, brown to dark brown, subulate and setiform central element 200–260 μm high, 7–9 μm wide above the somewhat radially lobed 20–30 μm wide base, with a whorl of 9–20 (–26) shorter, 50–120 μm long, 3–7 μm wide, inwardly curved, smooth, septate, pale brown to brown or dark brown, subulate and setiform lateral branches from which arise an enclosed series of short branches composed of very pale brown cells bearing the conidiogenous cells. *Conidiogenous cells* discrete, cylindrical to somewhat lageniform, 12–18 μm long, 2.5–3.5 μm wide, determinate, sometimes with a minute, often indistinct collarette at the apex. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* enteroblastic without progression leading to periclinal thickening. *Conidia* acrogenous, solitary, borne in a liquid droplet which on drying forms a white mass enclosed by the whorl of lateral branches on the coni-

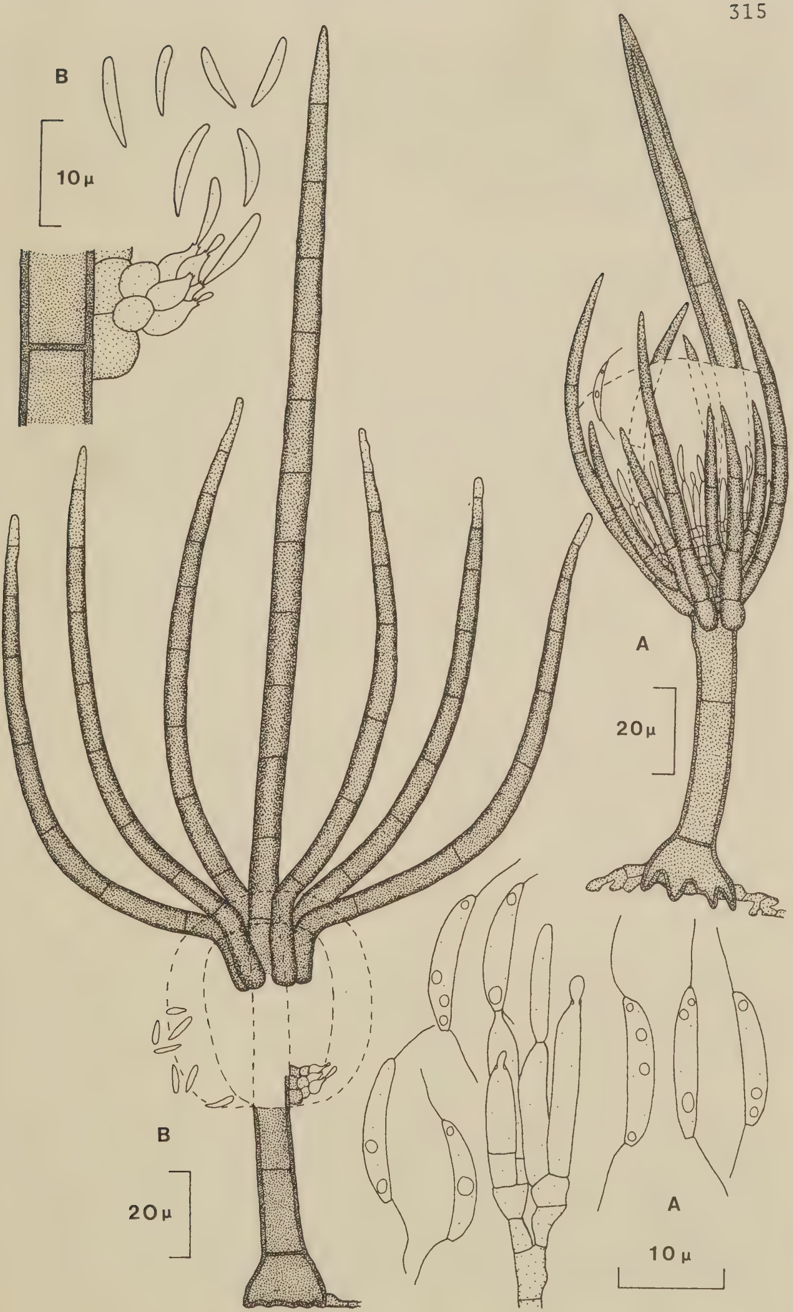
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Fig. 4. (A) *Chaetopsina keniensis* (Holotype). (B) *Chaetopsina ramifera* (P.M. Kirk 1611).

diophore, cylindrical to broadly fusiform, pointed at the apex, truncate at the base with an unthickened flat scar 0.8–1.2 μm wide, slightly curved, with a single, simple setula 5–7 μm long at each end, the setula at the apex terminal, that at the base attached at the rim of the scar on the concave side of the conidium, hyaline, smooth, non-septate, 2–4 guttulate, (11–) 12–16 μm long, 1.5–2.5μm wide.

Specimens examined: On dead leaves, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1506a, 1517a, IMI 285174a, holotype, 285185a.

The setulate conidia of *Chaetopsina keniensis* are at present unique in the genus and at once distinguish it from all other species. The inclusion in a single genus of species with setulate conidia and others with non-setulate conidia is known in at least two other genera of hyphomycetes, *Codinaea* and *Menispora* (see Ellis, 1971, 1976). Both these genera contain anamorphs of species of *Chaetosphaeria* sensu lato and it is interesting, therefore, to speculate that the teleomorph of *Chaetopsina keniensis* and, perhaps, other species of *Chaetopsina* also belong in *Chaetosphaeria*. The type species of *Chaetopsina, C. fulva* Rambelli (1956), however, is thought to be the anamorph of Nectriaceae (Sutton & Hodges,1976b) and it is therefore likely that *Chaetopsina* as presently circumscribed is somewhat heterogenous.

CHAETOPSINA RAMIFERA Matsushima, *Microfungi of the Solomon Islands and Papua-New Guinea*: 13 (1971). (Fig. 4B)

Conidiophores up to 300 μm high with 3–6 lateral branches up to 120 μm long. *Conidiogenous cells* lageniform, 5–7 μm long, 2.5–3.5 μm wide. *Conidia* narrowly clavate, rounded at the apex, attenuated at the base, 6–10 μm long, 1–1.5 μm wide.

Specimens examined: On dead leaves, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1512a, 1515c, 1527a, 1528b, 1529a, IMI 285180a, 285183c, 285195a, 285196b, 185197a; on dead leaf of ?*Ficus* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1611, IMI 286838.

Matsushima (1971) described *Chaetopsina ramifera* Matsushima from dead leaves of *Castanopsis* sp. from Papua-New Guinea. Later, Sutton & Hodges (1976b) reported its occurrence in Brazil on dead leaves of *Eucalyptus grandis* A.W. Hill ex Maiden, Sutton (1978b) described a collection on dead leaves of *Quercus virginiana* Miller from Florida, U.S.A. and Matsushima (1980) reported a collection on ?*Quercus* sp. leaves from Taiwan and Mel'nik (1983) reported it from the U.S.S.R. It is also known from

Australia on unidentified leaf litter (Herb. IMI unpupl.). The collections from Kenya, on dead leaves from at least two different species of tree extends its known range significantly and it appears likely that the species will be shown to have a worldwide distribution throughout the tropics and subtropics where suitable habitats occur.

Illustrations: Matsushima (1971), Sutton & Hodges (1976b).

CHAETOPSINA UNILATERALIS P.M. Kirk, sp. nov. (Fig. 5A)

Coloniae effusae, pilosae, brunneae, inconspicuae. Mycelium partim superficiale, partim in substrato immersum, ex hyphis pallide brunneis, ramosis, septatis, laevibus, 2–3 μm latis compositum. Conidiophora macronemata, mononemata, solitaria, erecta, simplicia, plerumque leviter curvata supra et a regione fertile proxime, setiformia, laevia, septate, brunnea, ad apicem leviter pallidiora, 205–250 μm alta, 5–6.5 μm lata, ad fundamentum leviter inflata ad 10–12 μm lata, ad apicem 2–3 μm lata. Cellulae conidiogenae discretae, plus minusve media ex conidiophori parti fertili unilateraliter exorientes, lageniformes et collaretta quaequae induta distinctae, ad apicem 1.5–2.5 μm latae, 10–14 μm longae, 3.5–4.5 μm latae. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio schizolytica. Proliferatio duobus modis est: (1) enteroblastica sine progressione sed cum regione incrassata periclinali. (2) enteroblastica percurrens et cum progressione ad locum conidiogenesis novum. Conidia acrogena, solitaria, in gutta exorientia quae statu exsiccata est alba visu, falcata, ad apicem fastigiata, ad fundamentum abrupte truncata, hyalina, laevia, sine septa, 22–27 μm longa, 0.5–0.8 μm lata.

In folio emortuo *Eucalypti* sp., P.M. Kirk 1539h, IMI 285388h, holotypus.

Colonies effuse, hairy, brown, inconspicuous. *Mycelium* partly superficial, partly immersed in the substratum, composed of pale brown, branched, septate, smooth hyphae 2–3 μm wide. *Conidiophores* macronematous, mononematous, solitary, erect, simple, usually slightly curved immediately above the fertile zone, setiform, smooth, septate, brown, slightly paler towards the apex, 205–250 μm high, 5–6.5 μm wide, 10–12 μm wide at the slightly swollen base, 2–3 μm wide at the apex. *Conidiogenous cells* discrete, arising unilaterally from a sub-median fertile zone on the conidiophore, lageniform with a distinct collarette 1.5–2 μm wide at the apex, 10–14 μm long, 3.5–4.5 μm wide, associated sterile elements absent. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* of two types: (1) enteroblastic without progression leading to periclinal thickening. (2) enteroblastic percurrent with progression leading to a new

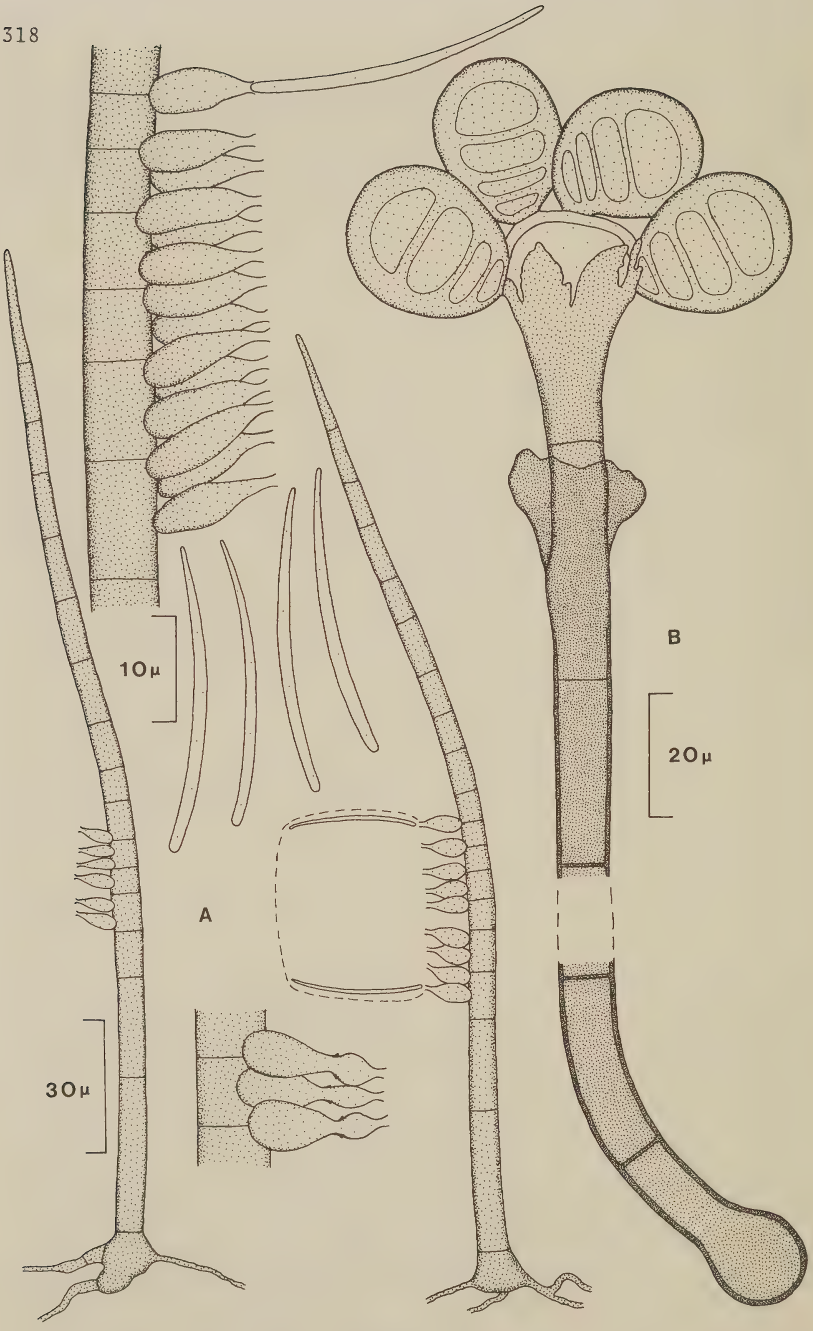
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Fig. 5. (A) *Chaetopsina unilateralis* (Holotype). (B) *Exserticlava triseptata* (P.M. Kirk 1392a).

conidiogenous locus. *Conidia* acrogenous, solitary, borne in a liquid droplet which on drying forms a white mass, falcate, tapered towards the apex, abruptly truncate at the base, hyaline, smooth, non-septate, 22–27 μm long, 0.5–0.8 μm wide.

Specimen examined: On dead leaf of *Eucalyptus* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1539h, IMI 285388h, holotype.

The description of *Chaetopsina unilateralis* further extends the range of morphological characteristics exhibited by species of *Chaetopsina*. It does not appear to be closely related to any other species presently referred to *Chaetopsina*, some of which show affinities with other genera of dematiaceous hyphomycetes. The conidiogenous cells of *C. auburnensis* Morgan-Jones (1979) suggest a relationship with *Circinotrichum fertile* Pirozynski & Hodges (1973), a species which is probably not related to other species of *Circinotrichum*. In *C. ludoviciana* Crane & Schoknecht (1982) the simple conidiophores are aggregated at the base of sterile setae with a more or less coronate apex and thus shows affinities with *Menisporopsis*. The apically and laterally fertile setae of *C. romanica* Rambelli & Lunghini (1979) are similar to the conidiophores of species of *Phaeostalagmus*.

The sessile unilateral conidiogenous cells and falcate, non-septate conidia of *C. unilateralis* serve to distinguish it from all other species. The conidia are similar to those of *C. virtuosa* Rambelli & Lunghini (1979) although here they are tapered at both ends, are 1-septate and are slightly longer and broader at 20–35 x 2–2.5 μm. In all other species the conidia are always less than 15 μm in length.

Species of *Cryptophiale* Pirozynski (1968) are characterized by sessile unilateral conidiogenous cells borne on an apically setiform conidiophore and in this respect it could be argued that *C. unilateralis* would be better placed there. However, what is believed to be the main taxonomic character of the genus *Cryptophiale*, namely the distinct shield-like aggregation of sterile cells surrounding and obscuring the conidiogenous cells, is absent in *C. unilateralis*. In this respect, *C. unilateralis* resembles, to a certain extent, *Cryptophiale manifesta* B. Sutton & Hodges (1976b), which possesses only a rudimentary shield and occupies a somewhat isolated position in *Cryptophiale*.

CHALARA PHAEOSPORA P.M. Kirk, sp.nov. (Fig. 2B)

Coloniae effusae, pilosae, fuscae ad atrae. Mycelium partim superficiale sed in substrato plerumque immersum, ex hyphis laevibus, ramosis, septatis, brunneis, 2–3 μm latis compositum. Conidiophora micronemata vel absentia. Cellulae conidiogenae cylindricae, ad fundamentum plerumque leviter inflatae, ex mycelio immerso orientes, laeves, atrobrunneae, cylindrico vento et cylindrico collo indutae, cum transitione ex ventro ad collo vix visibili, 95–125 μm altae, 7–10 μm latae ad fundamentum inflatae 14–18 μm latae. Conidiorum initium holoblasticum annulari modo. Conidiorum maturatio initio synchrona vel (respectu delimitionis) sequens. Conidiorum secessio schizolytica. Proliferatio non visa. Conidia catenata, in catenis longis et facile frangentibus formatia, cylindrica, ad apicem truncata et leviter convexa, laevia, sine septa, atrobrunnea, (7–) 10–14 μm longa, (5–) 6–8 μm lata.

In frontis caulibus emortuis *Cyathea* sp., P.M. Kirk 1590 IMI 285446, holotypus.

Colonies effuse, hairy, blackish-brown to black. *Mycelium* partly superficial but mostly immersed in the substratum, composed of smooth, branched, septate, brown hyphae 2–3 μm wide. *Conidiophores* micronematous or absent. *Conidiogenous cells* cylindrical, usually slightly swollen at the base, arising from the immersed mycelium, smooth, dark brown, comprising a cylindrical venter and a cylindrical collarette, transition from venter to collarette imperceptible, 95–125 μm high, 7–10 μm wide, 14–18 μm wide at the swollen base. *Conidial ontogeny* holoblastic by ring wall building. *Conidial maturation* synchronous with and subsequent to (delimitation) conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* not observed. *Conidia* catenate, formed in long, readily fragmenting chains, cylindrical with truncate and slightly convex apices, smooth, non-septate, dark brown, (7–) 10–14 μm long, (5–) 6–8 μm wide.

Specimen examined: On dead frond stem of *Cyathea* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1590, IMI 285446, holotype.

The consistently dark brown conidia of *Chalara phaeospora* are at present unique in the genus *Chalara*. Only in *C. cladii* M.B. Ellis (see Kirk & Spooner, 1984) and some of the anamorphs of *Ceratocystis* (see Nag Raj & Kendrick, 1975) are distinctly pigmented conidia known. Of these species, *C. phaeospora* appears closest to *C. cladii* differing in its shorter and broader, non-septate and consistently pigmented conidia, and absence of a septate conidiophore. It also resembles *Chalara brevicaule* Arambarri & Gamundi (Arambarri, Gamundi & Bucsinszky, 1981) but here the conidia are narrower, at 4–5 μm wide, and hyaline.

DISCHLORIDIUM KENIENSE P.M. Kirk, sp.nov. (Fig. 6A)

Coloniae effusae, pilosae, fuscae ad atrae. Mycelium partim superficiale sed in substrato plerumque immersum, ex hyphis ramosis, septatis, laevibus,

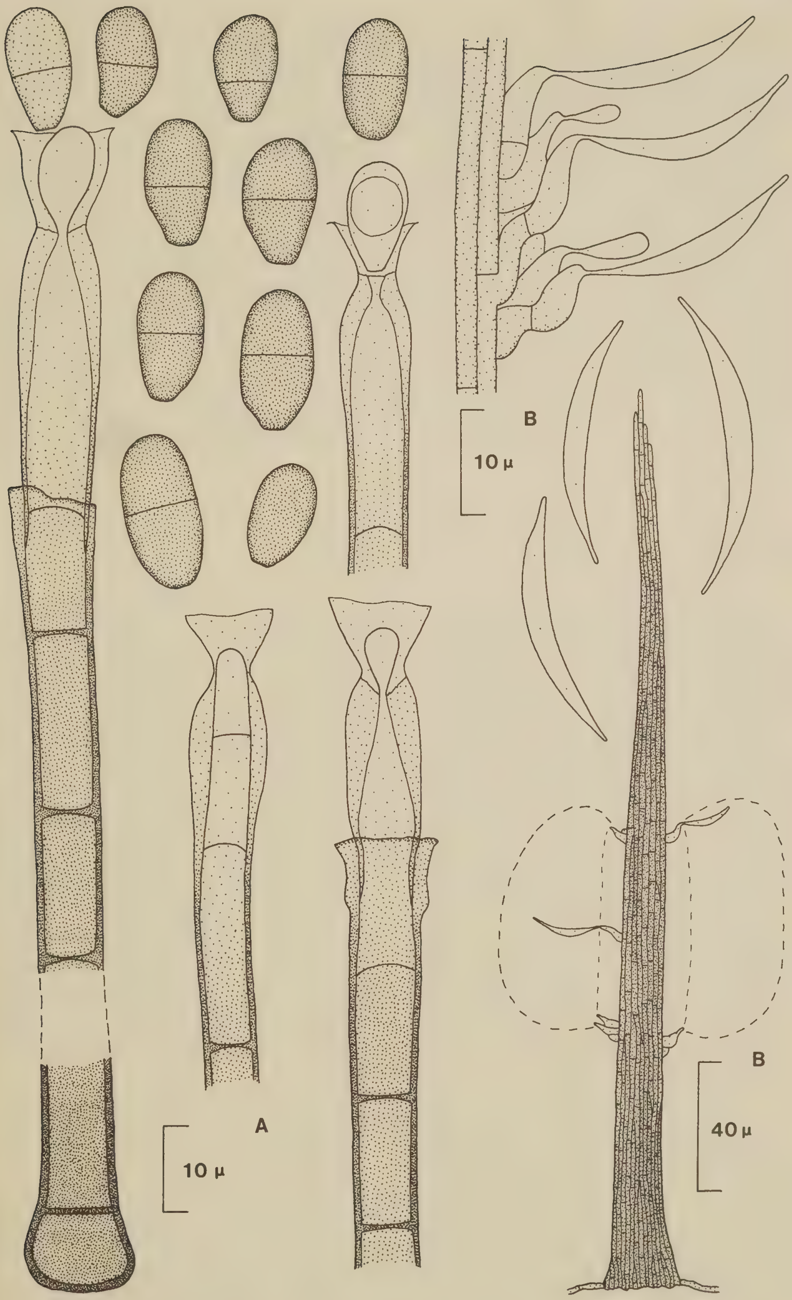
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Fig. 6. (A) *Dischloridium keniense* (Holotype). (B) *Phaeoisaria infrafertilis* (P.M. Kirk 1526a).

pallide brunneis ad brunneis, 2–4 μm latis compositum. Conidiophora macronemata, mononemata, solitaria, erecta, simplicia, recta vel leviter flexuosa, laevia, septata, brunnea ad atrobrunnea, ad apicem pallidiora, 180–420 μm alta, 7–9 (–11) μm lata, ad fundamentum leviter inflata usque ad 14 μm lata, ad apicem per usque ad 3 proliferationes percurrentes. Cellulae conidiogenae in conidiophoris incorporatae, terminales, percurrentes, collaretta ad apicem quaeque cupula et gandi indutae, 9–12 μm lata, 6–8 μm profunda. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona vel (respectu coloris) sequens. Conidiorum secessio schizolytica. Proliferatio duobus modis est: (1) enteroblastica sine progressione sed cum regione incrassata periclinali. (2) enteroblastica percurrens et cum progressione ad locum conidiogensis novum. Conidia acrogena, solitaria, in gutta exorientia quae statu exsiccato est fusco brunnea visu, late ellipsoidea ad obovata, ad fundamentum interdum truncata, cicatrice cum applanata 2–3 μm lata, brunnea, laevia, (0–) 1-euseptata, 11–18 μm longa, (6–) 7–9 μm lata.

In caulibus emortuis *Arundinariae alpinae*, P.M. Kirk 1372a, IMI 284775a, holotypus.

Colonies effuse, hairy, blackish-brown to black. *Mycelium* partly superficial but mostly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 2–4 μm wide. *Conidiophores* macronematous, mononematous, solitary, erect, simple, straight or slightly flexuous, smooth, septate, brown to dark brown, paler towards the apex, 180–420 μm high, 7–9 (–11) μm wide, up to 14 μm wide at the slightly swollen base, with up to 3 percurrent proliferations at the apex. *Conidiogenous cells* integrated, terminal, percurrent, with a large, cup-shaped collarette at the apex 9–12 μm wide, 6–8 μm deep. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with and subsequent to (pigment deposition) conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* of two types: (1) enteroblastic without progression resulting in periclinal thickening. (2) enteroblastic percurrent and progressive leading to the production of a new conidiogenous locus. *Conidia* acrogenous, solitary, produced in a liquid droplet which on drying forms a dark brown mass, broadly ellipsoid to obovate, sometimes truncate at the base with a flattened unthickened scar 2–3 μm wide, brown, smooth, (0–) 1-euseptate, 11–18 μm long, (6–) 7–9 μm wide.

Specimens examined: On dead stems of *Arundinaria alpina*, Naro Moru track, Mt Kenya, Kenya, 22 Jan. 1984, P.M. Kirk 1372a, 1373a, IMI 284775a, holotype, 284776a.

Sutton (1976) introduced *Dischloridium* for a single species, *D. laeense* (Matsushima) B. Sutton (Syn. *Chloridium laeense* Matsushima, see Matsushima, 1971), which he compared with *Craspedodidymum elatum* Holubová-Jechová (1972) and *Chloridium* sect. *Gongromeriza* (Gams & Holubová-Jechová, 1976). The present species differs from *D. laeense* in its dark brown, 1-septate conidia and large, conspicuous, cup-shaped collarette. However, the form of the conidiophore and conidiogenous cell, conidiogenesis, and the relatively large conidia suggest that the two taxa are probably closely related. Although *D. laeense* was described as producing conidiophores from an immersed stroma additional collections of this species in herb. IMI indicate that this characteristic often appears to be absent and the conidiophores in these collections are solitary, arising directly from the immersed mycelium. The dark brown conidia of *D. keniense* are similar to those of *Craspedodidymum elatum* except that there the conidia are non-septate and the conidiophore is dichotomously branched.

ENDOPHRAGMIELLA NAROMORUENSIS P.M. Kirk, sp.nov. (Fig. 7A)

Coloniae, effusae, pilosae, fuscae ad atrae. Mycelium partim superficiale sed in substrato plerumque immersum, ex hyphis brunneis, laevibus, ramosis, septatis, 1.5–4 μm latis compositum. Conidiophora macronemata, mononemata, solitaria vel in fasciculis bina ad terna, erecta, simplicia, recta, septata, laevia, brunnea ad atrobrunnea, ad apicem pallidiora, 80–200 μm alta, 7–10 μm lata, ad apicem usque ad 3 proliferationibus percurrentibus induta. Cellulae conidiogenae in conidiophoris incorporatae, terminales, percurrentes. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio rhexolytica fractam ob cellulae parietis conidiogenae c. 0.5 μm sub septum delimitationis. Proliferatio e cellula superna viva, per destructam partem cellulae conidiogenae prioris. Conidia acrogena, solitaria, late ellipsoidea ad obovoidea, (2–) 3 (4–)- euseptata, brunnea ad atrobrunnea, cellula distali et proximalis respectu plerumque pallidiora, laevia, 32–46 μm longa, 15–20 μm lata, ad fundamentum distincte fractam ob partem cellulae conidiogenae superiorem fimbriata.

In caulibus emortuis *Arundinariae alpinae*, P.M. Kirk 1375a, IMI 284778a, holotypus.

Colonies effuse, hairy, blackish brown to black. *Mycelium* partly superficial but mostly immersed in the substratum, composed of brown, smooth, branched, septate hyphae 1.5–4 μm wide. *Conidiophores* macronematous, mononematous, solitary or in groups of 2–3, erect, simple, straight, septate,

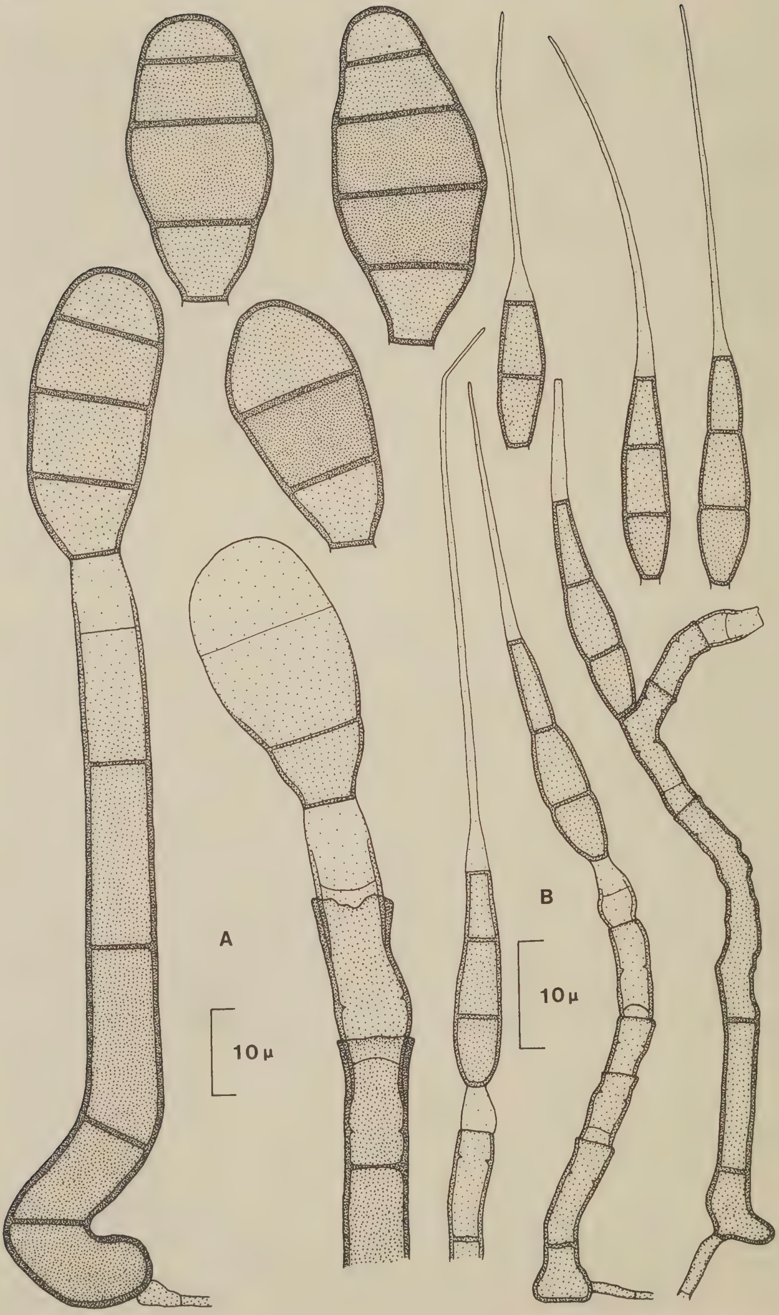

Fig. 7. (A) *Endophragmiella naromoruensis* (Holotype). (B) *Endophragmiella rostrata* (Holotype).

smooth, brown to dark brown, paler towards the apex, 80–200 μm high, 7–10 μm wide, with up to 3 or more percurrent proliferations at the apex. *Conidiogenous cells* integrated, terminal, percurrent. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* rhexolytic by fracture of the wall of the conidiogenous cell 0.5 μm below the conidium delimiting septum. *Proliferation* through the remains of the conidiogenous cell from the cell immediately below. *Conidia* acrogenous, solitary, broadly ellipsoid to obovoid, (2–) 3 (–4)-euseptate, brown to dark brown, distal and proximal cells usually paler, 32–46 μm long, 15–20 μm wide, with a minute basal frill derived from the apex of the conidiogenous cell.

Specimens examined: On dead stem of *Arundinaria alpina,* Naro Moru track, Mt Kenya, Kenya, 22 Jan. 1984, P.M. Kirk 1373b, 1375a, IMI 284776b, 284778a, holotype.

ENDOPHRAGMIELLA ROSTRATA P.M. Kirk, sp. nov. (Fig. 7B)

Coloniae effusae, pilosae, atrobrunneae ad fuscae. Mycelium partim superficiale sed in substrato plerumque immersum, ex hyphis pallide brunneis ad brunneis, laevibus, ramosis, septatis, 1.5–2 μm latis compositum. Conidiophora macronemata, mononemata, solitaria vel in fasciculis bina ad quaterna, erecta vel ascendentia, simplicia, curvata ad interdum flexuosa, septata, laevia, brunnea, ad apicem pallidiora, 20–70 μm alta, 2.5–3.5 μm lata, ad apicem per usque ad 4 proliferationes crescentia. Cellulae conidiogenae in conidiophoris incorporatae, terminales, percurrentes. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio rhexolytica fractam ob cellulae parietis conidiogenae c. 0.5 μm sub septum delimitationis. Proliferatio e cellula superna viva, per destructam partem cellulae conidiogenae prioris. Conidia acrogena, solitaria, obclavata, rostrata, (2–) 3-euseptate, ad septa interdum leviter constricta, pallide brunnea ad brunnea, laevia, 13–24 μm longa, 4–5 μm lata, cum rostro 25–60 μm longo, ad fundamentum distincte et minute fractam ob partem cellulae conidiogenae superiorem fimbriata.

In ligno carioso arboris ignotae, P.M. Kirk 1592a, IMI 285427a, holotypus.

Colonies effuse, hairy, dark brown to blackish brown. *Mycelium* partly superficial but mostly immersed in the substratum, composed of pale brown to brown, smooth, branched, septate hyphae 1.5–2 μm wide. *Conidiophores* macronematous, mononematous, solitary or in groups of 2–4, erect or ascending, simple, curved to somewhat flexuous, septate, smooth, brown, paler towards the apex, 20–70 μm high, 2.5–3.5 μm wide, with up to 4 or more percurrent proliferations at the apex. *Conidiogenous cells* integrated, terminal, percurrent. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* rhexolytic by fracture of the wall of the conidiogenous cell c. 0.5 μm below the conidium delimiting septum. *Proliferation* through the remains of the conidiogenous cell from the cell immediately below. *Conidia* acrogenous, solitary, obclavate, rostrate, (2–) 3-euseptate, sometimes slightly constricted at the septa, pale brown to brown, smooth, body of conidium 13–24 μm long, 4–5 μm wide, rostrum 25–60 μm long, with a small basal frill derived from the apex of the conidiogenous cell.

Specimen examined: On rotten wood, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1592a, IMI 285427a, holotype.

Hughes (1979) recognized 33 species of *Endophragmiella* following his transfer to this genus of the majority of names formerly referred to *Endophragmia*, a name which he rejected because the holotype of the type species was lost and he could not satisfactorily interpret conidiogenesis and the mechanism of conidiophore proliferation from the available description and illustrations.

Subsequently, the following 11 additional species of *Endophragmiella* have been described:- *E. africana* P.M. Kirk (1982d); *E. arranensis* P.M. Kirk (Kirk & Spooner, 1984); *E. constricta* Dunn (1982); *E. corticola* P.M. Kirk (1982a); *E. fagicola* P.M. Kirk (1981a); *E. fallacia* P.M. Kirk (1981b); *E. lauri* P.M. & C.M. Kirk (Kirk, 1982b); *E. ovoidea* P.M. Kirk (1981a); *E. pulchra* (B. Sutton & Hodges) P.M. Kirk (1982b); *E. resinae* P.M. Kirk (1981a); *E. suttonii* P.M. Kirk (1981b).

Of the two species described here, *E. rostrata* shows some affinities with *E. corticola* but differs in its narrower conidia with less variable septation and longer apical cell. *Endophragmiella naromoruensis* is unlike any of the other species in the genus.

The following key to the 46 described species of *Endophragmiella*, based on that published by Hughes (1979), is presented.

KEY TO SPECIES OF *ENDOPHRAGMIELLA*

1. Conidia dictyoseptate, obovoid ... ... *E. fuliginosa*
1. Conidia with transverse septa only 2

    2. Conidia 0-septate, subcylindrical to spherical 3
    2. Conidia with (0–) 1 or more septa, variously shaped 5

3. Conidia rough-walled, (11.5–) 12.5–14.5 (–16.5) μm diam. *E. dingleyae*
3. Conidia smooth-walled 4

4. Conidia 10–12.5 μm diam. ... ... *E. leonensis*
4. Conidia 16–22 μm diam. ... ... *E. albiziae*

5. Conidia (0–) 1-septate 6
5. Conidia (1–) 2–3 (–7)-septate 16

6. Upper cell of conidia 1.5–3 times longer than lower cell 7
6. Upper cell of conidia slightly longer or same size as lower cell 9

7. Upper cell dark brown to blackish-brown, lower cell truncate with broad scar 3.5–5 μm diam. ... *E. dimorphospora*
7. Upper cell pale brown to dark brown, scar less than 3.5 μm diam. 8

8. Upper cell brown to dark brown, lower cell hemispherical with scar 2–3.5 μm diam. ... *E. globosa*
8. Upper cell pale brown, lower cell hemispherical with scar 1.5–2 μm diam. ... ... *E. resinae*

9. Conidia ovoid, 10–16 x 5–6.5 μm ... ... *E. ovoidea*
9. Conidia ellipsoid or pyriform 10

10. Conidia narrowly ellipsoid, 14.5–20.5 x 4.5–5.5 μm ... ... *E. angustispora*
10. Conidia pyriform to broadly ellipsoid 11

11. Conidia pyriform, basal frill inconspicuous 12
11. Conidia predominantly broadly ellipsoid, basal frill conspicuous, 1–1.5 μm long 14

12. Cells equal ... ... *E. taxi*
12. Upper cell slightly larger 13

13. Conidia (10–) 11–14 x 5.5–7 μm ... ... *E. pinicola*
13. Conidia 18–22 x 12–13.5 μm ... ... *E. boewei*

14. Conidia 6.5–9.5 x 4–5 μm ... ... *E. arranensis*
14. Conidia over 6.5 μm wide 15

15. Conidia brown to dark brown, sometimes 0-septate, 16–25 x 9–12.5 µm ... ... *E. uniseptata*
15. Conidia pale brown to brown, sometimes 2-septate, (12.5–) 15–19 x 6.5–9.5 µm ... ... *E. pallescens*

16. Conidia predominantly 7-septate, navicular ... 17
16. Conidia usually with less than 7 septa, variously shaped 18

17. Conidium scar 5.5–6.5 µm diam. ... ... *E. socia*
17. Conidium scar 7–8.5 µm diam. ... ... *E. valdiviana*

18. Conidia predominantly 5-septate, 70–90 11–17 µm ... ... *E. fagicola*
18. Conidia usually with less than 5 septa 19

19. Conidia 4-septate, symmetrically septate with the central cells constricted and shorter than the other cells ... ... *E. africana*
19. Conidia (1–) 2–3 (–7)-septate 20

20. Conidia ellipsoid to subcylindric to obovoid or pyriform 21
20. Conidia obclavate 42

21. Conidiophores verticillately branched ... ... *E. verticillate*
21. Conidiophores simple or irregularly branched 22

22. Conidia 5.5–7.5 µm wide 23
22. Conidia 7–9 µm wide 25

23. Conidia obovoid, predominantly 3-septate ... ... *E. bisbyi*
23. Conidia ellipsoid 24

24. Conidia (1–) 2 (–7)-septate, 21–36 µm long ... ... *E. hymenochaeticola*
24. Conidia (1–) 3-septate, 17–21 µm long *E. eboracensis*

25. Conidiophores and/or conidia partly or entirely dark brown 26
25. Conidiophores and/or conidia very pale brown to brown 38

26. Conidium wall up to 3 µm thick ... ... *E. boothii*
26. Conidium wall up to 1.5 µm thick 27

27. Conidia markedly obovoid to pyriform 28
27. Conidia ellipsoid to barely obovoid 31

28. Conidia 12.5–16 (–18) μm wide ... *E. biseptata*
28. Conidia less than 12.5 μm wide 29

29. Conidium scar 3–4.5 μm diam. ... ... *E. ellisii*
29. Conidium scar less than 2.5 μm diam. 30

30. Conidia symmetrically septate ... ... *E. ontariensis*
30. Conidia distinctly asymmetrically septate ... ... *E. suttonii*

31. Central cell of conidium constricted ... ... *E. constricta*
31. Central cell(s) of conidia not constricted 32

32. Conidia up to 9.5 μm wide 33
32. Conidia over 9.5 μm wide 35

33. Conidia predominantly less than 22 μm long 34
33. Conidia 22–32 x 6–9 μm ... ... *E. lauri*

34. Conidia 14.5–17 (–20) x 7–8.5 (–9) μm ... ... *E. collapsa*
34. Conidia (16–) 18–21.5 (–23.5) x 8–9.5 μm ... ... *E. tripartita*

35. Conidia up to 14.5 μm wide 36
35. Conidia 32–46 x 15–20 μm ... ... *E. naromoruensis*

36. Conidia concolourous 37
36. Conidia with central cell dark brown, 16–30 x 9–13 μm ... ... *E. fallacia*

37. Conidia 9.5–11.5 μm wide ... ... *E. oblonga*
37. Conidia (11.5–) 12.5–13.5 (–14.5) μm wide ... *E. hughesii*

38. Conidia less than 27 μm long, 2- or predominantly 2-septate 39
38. Conidia more than 27 μm long, (2–) 3 (–4)-septate 40

39. Conidia obovoid, central cells usually shortest ... *E. theobromae*
39. Conidia ellipsoid, cells of equal length ... ... *E. pallescens*

40. Conidia 8.5–12 µm wide, with a simple, apical, filiform appendate ... *E. pulchra*
40. Conidia without an appendage 41

41. Conidia 9–12.5 µm wide, distal cell rounded ... *E. novae-zelandiae*
41. Conidia 12–18 µm wide, distal cell tapered or conical ... ... *E. subolivacea*

42. Conidia 2-septate 43
42. Conidia 1–3 (–4)-septate 44

43. Conidia 13.5–19.5 x 4.5–5.5 µm, central cell brown ... ... *E. lignicola*
43. Conidia 20–27 x (5.5–) 7–8.5 µm, lower cells brown ... ... *E. curvata*

44. Conidia 3-septate 45
44. Conidia 1–3 (–4)-septate 46

45. Central cells of conidia brown, apical cell conical ... *E. cesatii*
45. Lower cells of conidia brown, apical cell filiform ... *E. uniseptata*

46. Conidia 4–5 µm wide, (2–) 3-septate ... *E. rostrata*
46. Conidia 5–6.5 µm wide, 1–3 (–4)-septate ... *E. corticola*

EXSERTICLAVA TRISEPTATA (Matsushima) S. Hughes, *N.Z. Jl.Bot.* **16**: 333 (1978). (Fig. 5B)

Cordana triseptata Matsushima, *Icones microfungorum a Matsushima lectrum* (Kobe): 39 (1975).

Colonies effuse, hairy, dark brown to blackish-brown. *Mycelium* partly superficial but mostly immersed in the substratum, composed of branched, smooth, septate, pale brown to brown hyphae 1.5–3 µm wide. *Conidiophores* macronematous, mononematous, solitary, simple, erect, straight or sometimes curved, especially at the base, smooth, septate, brown to dark brown, paler towards the apex, 160–240 µm high, 6–8 µm wide. *Conidiogenous cells* terminal, clavate, comprising a thick-walled, hyaline apical swelling 18–26 µm diam. bearing the conidia and protruding from a fragmented, funnel-shaped area originating from the pigmented outer wall. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* of two types: (1) holoblastic sympodial without progression resulting in the formation of 4–6 conidia from the same conidiogenous cell. (2) enteroblastic percurrent and progressive leading to the production of a new conidiogenous cell. *Conidia* acrogenous, broadly obovoid to broadly ellipsoid or subglobose, smooth, pale brown to olivaceous-brown, 3-distoseptate, cell lumina reduced, 24–28 (–31) μm long, 20–24 μm wide.

Specimen examined: On dead stem of *Arundinaria alpina*, Naro Moru track, Mt Kenya, Kenya, 22 Jan. 1984, P.M. Kirk 1392a, IMI 284795a.

Matsushima (1975) described *Cordana triseptata* Matsushima from dead stems of *Phyllostachys edulis* A. & C. Rivière collected in Japan. Later, Hughes (1978) transferred the name to *Exserticlava*, a genus introduced for *E. triseptata* (Matsushima) S. Hughes and *E. vasiformis* (Matsushima) S. Hughes (Syn. *Cordana vasiformis* Matsushima, 1975). The present collection differs slightly, especially in the shape and size of the conidia, from that described by Matsushima. However, since both connections are on Bambuseae it seems inadvisable, at least for the present, to introduce a new epithet for the collection from Kenya.

JANETIA LONGISPORA P.M. Kirk, sp.nov. (Fig. 3B)

Coloniae effusae, pilosae, pallide brunneae ad brunneae. Mycelium partim superficiale, partim in substrato immersum, mycelio immerso ex hyphis pallide brunneis, laevibus, ramosis, septatis, 2–5 μm latis compositum, mycelio superficiale reticulo ex hyphis pallide brunneis ad brunneis, laevibus, ramosis, septatis, 6–8 μm latis cellulas ferentibus conidiogenas. Conidiophora micronemata, mononemata. Cellulae conidiogenae in conidiophoris incorporatae, saepe intercalaria, subglobosa ad ampulliformia, laevia, pallide brunnea, 10–14 μm alta, 5–10 μm lata, 1(–3) denticulata, denticulis ipsis conicis atrobrunneis, 1.5–2.5 μm latis et in apice abrupte truncatis. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio schizolytica. Proliferatio holoblastica vel enteroblastica et sympodialis, vel absens. Conidia acrogena, solitaria, obclavata, rostrata, (6–) 9–12-euseptata, cellularum luminibus leviter deminutis, laevia, pallide olivaceobrunnea, ad apicem pallidiora, ad fundamentum imum aliquid fusciora et cum zona subhyalina in cellulae imae regione in qua paries angustior est, (90–) 146–260 (–285) μm longa, (10–) 12–15 μm lata in parte maxima, circa apicem 4–5 μm lata, ad fundamentum abrupte truncata et sese protuberantia, 1.5–2.5 μm lata.

In folio emortuo *Eucalypti* sp., P.M. Kirk 1546, IMI 285395, holotypus.

Colonies effuse, hairy, pale brown to brown. *Mycelium* partly superficial, partly immersed in the substratum, immersed mycelium composed of pale brown, smooth, branched, septate hyphae 2–5 μm wide giving rise to a superficial network of pale brown to brown, smooth, branched, septate hyphae 6–8 μm wide bearing the conidiogenous cells. *Conidiophores* micronematous, mononematous. *Conidiogenous cells* integrated, mostly intercalary, subglobose to ampulliform, smooth, pale brown, 10–14 μm high, 5–10 μm wide, denticulate, with 1 (–3) conical, dark brown denticles 1.5–2.5 μm wide and abruptly truncate at the apex. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* holoblastic or enteroblastic sympodial or absent. *Conidia* acrogenous, solitary, obclavate, rostrate, (6–) 9–12-euseptate, cell lumina slightly reduced, smooth, pale olivaceous brown, paler towards the apex, slightly darker at the extreme base and with a sub-hyaline band in the basal cell where the wall is noticeably thinner, (90–) 145–260 (–285) μm long, (10–) 12–15 μm wide in the broadest part, 4–5 μm wide near the apex, 1.5–2.5 μm wide at the abruptly truncate and somewhat protuberant base.

Specimen examined: On dead leaf of *Eucalyptus* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1546, IMI 285395, holotype.

Ellis (1976) introduced *Janetia* for two species essentially characterized by a superficial non-hyphopodiate mycelium giving rise to intercalary denticulate conidiogenous cells bearing solitary, typically obclavate and euseptate conidia. The type species, *J. euphorbiae* M.B. Ellis, was described from stems of *Euphorbia tirucalli* L. collected in Tanzania whilst the second species, *J. faureae* (Piroz.) M.B. Ellis, based on *Sporidesmium faureae* Piroz. (Pirozynski, 1972), was described from fallen leaves also collected in Tanzania. Gamundi, Arambarri & Bucsinszky (1979) added *J. bacilliformis* Gamundi, Arambarri & Giaiotti from leaves of *Nothofagus dombeyi* Blume collected in Argentina and Hughes & Cavalcanti (1983) described *J. mangiferae* S. Hughes & Caval.from leaves of *Mangifera indica* L. from Brazil.

Hughes (1983), in a review of the genus, described *J. capnophila* S. Hughes associated with *Acrogenotheca elegans* (Fraser) Cif. & Batista and *Euantennaria* sp. on *Shawia paniculata* Forster from New Zealand and added *J. bonarii* (M.B. Ellis) S. Hughes on leaves of *Torreya* sp. from the U.S.A., *J. garryae* (Bonar) S. Hughes on leaves of *Garrya* sp. also from the U.S.A. and *J. leprosa* (Piroz.) S. Hughes on leaves of *Faurea saligna* Harvey from Tanzania. He also observed that *Janetia* would seem to be a more suitable disposition for some other foliicolous species currently included in *Sporidesmium*.

Janetia longispora is readily distinguished from all other species by the distinct sub-hyaline band in the basal cell of the conidia and their extreme length. Based on Hughes' observation concerning other species of *Sporidesmium* and the presence of the distinct band in the basal cell of *J. longispora*, slides from the holotype of *Microclava coccolobiae* F. Stevens (1917, Syn. *Sporidesmium coccolobiae* (F. Stevens) M.B. Ellis, 1976) were examined since the conidia in this species also have a similar band and are borne on conidiogenous cells arising directly from a superficial mycelium. The examination revealed scattered lobata hyphopodia on the mycelium and the following combination is therefore proposed: **Clasterosporium coccolobae** (F. Stevens) P.M. Kirk, comb. nov. (basionym: *Microclava coccolobae* F. Stevens, *Trans. Ill. Acad. Sci.* **10**: 206, 1917). Also on the slide were immature ascomata of a species of ?*Asterina* and this is undoubtedly the teleomorph of *C. coccolobiae*. The apparently closely related *C. anomalum* (Speg.) S. Hughes (see Ellis, 1971) is the anamorph of *Asterina anomala* Sivanesan (1984) although the teleomorph of *C. cyperi* M.B. Ellis (1958) is a unitunicate ascomycete, *Clasterosphaeria cyperi* (Sivanesan). *Clasterosporium* as circumscribed by Ellis (1971) is obviously somewhat heterogenous. However, since the teleomorph of the type species, *C. caricinum* Schweinitz, is presently unknown a satisfactory revision of the genus is not yet possible. It would also seem premature to refer species presently classified in *Sporidesmium* to *Janetia* until the teleomorphs of taxa in the latter genus have been discovered.

The following key to species of *Janetia* is presented.

KEY TO SPECIES OF *JANETIA*

1. Conidia up to 10 μm wide 2
1. Conidia over 10 μm wide 3

2. Conidia (2–) 3-septate ... ... *J. leprosa*
2. Conidia usually with more than 3 septa ... 4

3. Conidia 55–95 μm long, 5–12-septate ... ... *J. bonarii*
3. Conidia (60–) 80–125 (–145) μm long, (7–) 9–13(–16)-septate ... ... *J. capnophila*
3. Conidia (90–) 145–250 (–285) μm long, (6–) 9–12-septate ... ... *J. longispora*

4. Conidia up to 5 (–6) μm wide 5
4. Conidia more than 5 μm wide 6

5. Conidia 8.5–23 μm long, (1–) 2–4 (–5)-septate ... *J. mangiferae*
5. Conidia 50–120 μm long, 3–9-septate ... ... *J. faureae*

6. Conidia with up to 6 septa, up to 70 μm long 7
6. Conidia 5–9-septate, 60–156 μm long ... *J. bacilliformis*

7. Conidia 18–36 μm long ... ... *J. euphorbiae*
7. Conidia 25–70 μm long ... ... *J. garryae*

MENISPORA BRITANNICA (M.B. Ellis) P.M. Kirk, comb.nov. (Fig.8A)
Codinaea britannica M.B. Ellis, *More Dematiaceous Hyphomycetes*: 472 (1976).

Colonies effuse, hairy, brown to dark brown or with a yellowish-green appearance due to profuse sporulation. *Mycelium* partly superficial but mostly immersed in the substratum, composed of smooth, pale brown, branched, septate hyphae 1.5–3 μm wide. *Setae* sterile, erect, simple, straight, subulate, dark brown, paler towards the apex, smooth, septate, (160–) 215–305 μm high, 5–7 μm wide, 9–11 μm wide at the slightly swollen base, 2–2.5 μm wide near the apex. *Conidiophores* macronematous, mononematous, arising in groups of 2–5 from the base of the setae, slightly curved near the base, pale brown, paler towards the apex, simple, smooth, septate, 42–106 μm high. 2.5–3.5 μm wide, usually slightly swollen and up to 4 μm wide near the apex. *Conidiogenous cells* integrated or discrete, terminal, cylindrical or slightly swollen, abruptly recurved at the apex, with an indistinct collarette. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* of two types: (1) enteroblastic without progression resulting in periclinal thickening. (2) enteroblastic sympodial and progressive leading to the production of a new conidiogenous locus. *Conidia* acrogenous, solitary, borne in a liquid droplet which on drying forms a white or yellowish-green mass on the side of the conidiogenous cell, narrowly ellipsoid to fusiform, slightly curved, with a single setula 4–6 μm long at each end, hyaline, smooth, non-septate, (13–) 15–18 (–20) μm long, 2–2.5 μm wide.

Specimens examined: On dead leaf of *Ocotea usambarensis*, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1473a, 1489, IMI 285142a, 285157; on dead stem of *Filipendula ulmaria* Maxim., Loch Clunie, Perthshire, Sept. 1953, M.B. Ellis, IMI 54365, holotype.

The recurved apex of the conidiogenous cell in *Menispora britannica* is rather fragile and readily becomes detached during slide preparation, adhering to the group of conidia which it bore. The conidiophores illustrated by Ellis (1976: Fig. 374B) appear to be examples where this phenomenon has occurred.

With the inclusion of the present species in *Menispora* the range of morphological characters exhibited by the known species is further extended. In some, for example the type species *M. ciliata* Corda (see Hughes & Kendrick, 1968), the conidiogenous cells are sessile or borne singly on short branches in a unilateral series arising from an erect conidiophore which is setiform and sinuous at its apex. In other species, such as *M. manitobaensis* B. Sutton (1973), the conidiogenous cells are borne on a more complex system of branches arising from a conidiophore which is also setiform and

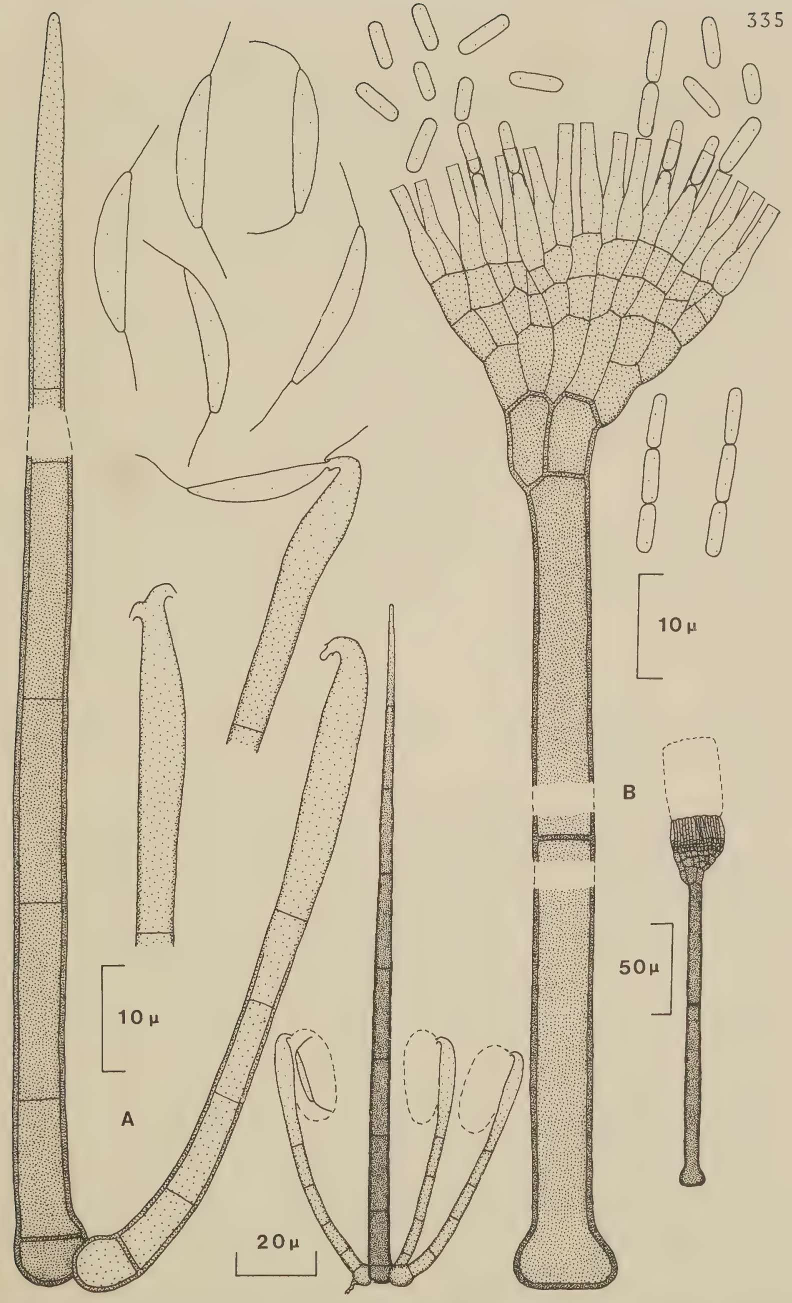
10 μ
A
20 μ
10 μ
B
50 μ

Fig. 8. (A) *Menispora britannica* (P.M. Kirk 1489). (B) *Phialocephala foliicola* (Holotype).

somewhat sinuous or loosely coiled at its apex. Both these species differ, however, in the morphology of the conidiogenous locus and of the conidia. In the former species the apex of the conidiogenous cell, where the conidiogenous locus develops, is strongly recurved through a full 180° and the non-septate conidia bear a single setula at each end. In the latter species the apex of the conidiogenous cell is not or only slightly recurved and the 3-septate conidia are non-setulate. By contrast, in *M. uncinata* S. Hughes & Kendrick (1968) the conidiogenous cells, which resemble those of *M. ciliata*, as do the conidia, are borne at the apex of unbranched conidiophores which are accompanied by long, sterile, sinuous or more or less coiled setae. In *M. britannica* which appears closest to *M. uncinata*, the setae are straight and the only character which distinguishes it from some species presently referred to *Codinaea* (see Hughes & Kendrick, 1968) is the recurved apex of the conidiogenous cell. Species in both genera have been shown to be the anamorphs of species of *Chaetosphaeria* and it seems inappropriate that such anamorphs should be separated generically since a similar degree of variability to that which has been described above for species of *Menispora* can be found amongst species of *Codinaea*. Perhaps infrageneric ranks would provide a more suitable classification for these apparently closely related anamorph taxa.

PHAEOISARIA INFRAFERTILIS B. Sutton & Hodges, *Nova Hedwigia* 27: 219 (1976). (Fig. 6B)

Colonies effuse, hairy, brown. *Mycelium* partly superficial, partly immersed in the substratum, composed of branched, septate, smooth, pale brown to brown hyphae 2–3.5 μm wide. *Synnemata* erect, rigid, straight, simple, subulate, dark brown, up to 360 μm high, up to 20 μm wide at the base, composed of dark brown, smooth, septate hyphae 2–3 μm wide. *Conidiogenous cells* extending over a zone just below the middle third of the synnema, lageniform, 6–12 μm long, 2–4 μm wide, with up to 6 small, unthickened denticles at the apices. *Conidia ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* holoblastic sympodial. *Conidia* forming a white conidial mass encircling the synnema, hyaline, aseptate, smooth, falcate with the ends abruptly attenuated and drawn out into a short, somewhat filiform appendage, (18–) 22–28 μm long, 2(–2.5) μm wide.

Specimens examined: On dead leaf, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1526a, 1532b, IMI 285194a, 285200b.

Sutton & Hodges (1976a) described *Phaeoisaria infrafertilis* B. Sutton & Hodges from dead leaves of *Eucalyptus* sp. collected in Brazil. The present collections differ slightly from the holotype in their larger synnemata (only up to 200 x 10 μm in the holotype) and somewhat longer conidia (only 19.5–22 μm long in the holotype). These differences are interpreted as being the result of the more prolific growth of the fungus in the collections cited above. The morphology of the conidia as described above also differs slightly from that described and illustrated by Sutton & Hodges. An examination of the holotype has, however, revealed conidia of a form identical to that as described and illustrated here.

The present collections appear to represent the first record of *P. infrafertilis* since its description.

Illustrations: Sutton & Hodges (1976a).

PHIALOCEPHALA FOLIICOLA P.M. Kirk, sp.nov. (Fig. 8 B)

Coloniae effusae, pilosae, brunneae, saepe inconspicuae. Mycelium partim superficiale sed in substrato plerumque immersum, ex hyphis pallide brunneis, ramosis, laevibus, septatis, 2–4 μm latis compositum. Conidiophora macronemata, mononemata, simplicia, solitaria, erecta, recta, laevia, brunnea ad atrobrunnea, 180–240 μm alta, e duobus partibus composia: primo e stipe uniseptata, 140–200 μm alta, 6–7 (–8) μm lata, 9–12 μm lata in fundamento rotundato, deinde e capite compacto, symmetrico, obconicali, ramulosa habenti septatos in quibus sint cellulae conidiogenae terminales; ramulis ipsis atrobrunneis, crassitunicatis, 7–10 μm longis, 2.5–4.5 μm latis. Cellulae conidiogenae discretae, terminales, lageniformes, cum ventro ellipsoideo 4.5–5.5 μm longo, 2–2.5 μm lato, et collo cylindrico 5.5–6.5 μm longo,1.8–2.2 μm lato. Conidiorum initium holoblasticum annulari modo. Conidiorum maturatio initio synchrona vel (respectu delimitationis)sequens. Conidiorum secessio schizolytica. Proliferatio ignota. Conidia catenata, in guttula mucosa lata quae statu sicco flava visu in conidiophori apice stat, non-septata, laevia, hyalina, flavo-brunnea, cylindrica rotundatis cum terminis, 4–6 μm longa, 1.5–2 μm lata.

In folio emortuo arboris ignotae, P.M. Kirk 1531a, IMI 285199a, holotypus.

Colonies effuse, hairy, brown, often inconspicuous. *Mycelium* partly superficial but mostly immersed in the substratum, composed of pale brown, branched, smooth, septate hyphae 2–4 μm wide. *Conidiophores* macronematous, mononematous, simple, solitary, erect, straight, smooth, brown to dark brown, 180–240 μm high, comprising a 1-septate stipe 140–200 μm high, 6–7 (–8) μm wide, 9–12 μm wide at the swollen base, and a compact, symmetrical, obconical head formed from septate branches which bear the conidiogenous cells terminally, primary branches dark brown, thick-walled, 7–10 μm long, 2.5–5 μm wide. *Conidiogenous cells* discrete, terminal, lageniform, comprising an ellipsoid venter 4.5–5.5 μm long, 2–2.5 μm wide and a cylindrical collarette 5.5–6.5 μm long, 1.8–2.2 μm wide. *Conidial ontogeny* holoblastic by ring wall building. *Conidial maturation* synchronous with and subsequent to conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* unknown. *Conidia* catenate, borne in a slimy droplet which on drying forms a yellowish cylindrical mass at the apex of the conidiophore, non-septate, smooth, hyaline, yellowish-brown in mass, cylindrical with rounded ends, 4–6 μm long, 1.5–2 μm wide.

Specimens examined: On dead leaf, Castle Forest, Mt. Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1531a, 1532a, IMI 285199a, holotype, 285200a.

A key to the 14 described species of *Phialocephala* was provided by Onofri & Zucconi (1984). From this key the present species comes closest to *P. bactrospora* Kendrick (1961) and *P. truncata* B. Sutton (1975). It differs from *P. truncata* especially in its invariably 1-septate conidiophores and the morphology and arrangement of the branches bearing the conidiogenous cells. How it is distinguished from *P. bactrospora* is rather more difficult to define. This species is presently only known with certainty from pure cultures where the range of variation in morphological characters is likely to be much greater than that found in collections from the natural substratum. What is probably a satisfactory distinguishing character is found when the conidiogenous cells are compared. In *P. bactrospora* there is a slight but distinct constriction at the junction of the collerette and venter. This characteristic is absent from *P. foliicola*. Also, in *P. bactrospora*, the conidia exhibit a greater size range and the branches at the apex of the conidiophore are not compact but distinctly open. These characters, however, are probably influenced by the conditions under which the fungus is growing.

Ichinoe (1967) described a culture, isolated from soil from Japan, which was referred to *P. bactrospora* and this agreed, in all significant areas, with the description of the holotype. Another collection from Japan referred to *P. bactrospora* was described by Matsushima (1975) from leaves of *Quercus glauca* Thunb. It would appear, from the description and illustrations provided, that this collection represents *P. foliicola*. Attempts to obtain pure cultures from the present collection were unsuccessful.

SPORIDESMIUM BRACHYPUS (Ell. & Ev.) S. Hughes, *Can. J. Bot.* **36**: 807 (1958). (Fig. 9A)

Conidiophores 70-110 μm high, 6–8 μm wide. *Conidia* broadly ellipsoid, 5 (–6)-distoseptate, body of conidium 44–50 μm long, 16–20 μm wide, appendage up to 55 μm long.

Specimen examined: On dead leaf of *Ocotea usambarensis*, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1475a, IMI 285144a.

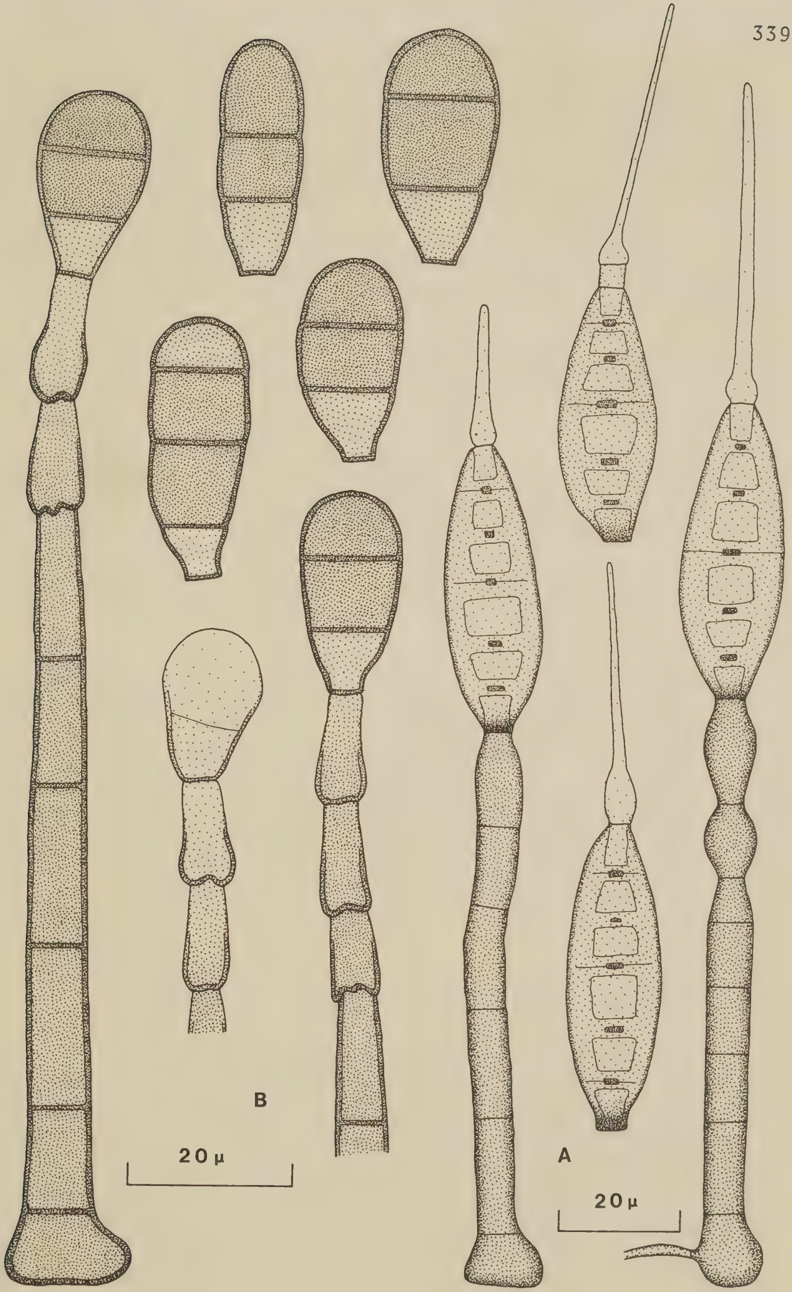

Fig. 9. (A) *Sporidesmium brachypus* (P.M. Kirk 1475a). (B) *Sporidesmium doliiforme* (P.M. Kirk 1377a).

Ellis (1971) redescribed this species having previously reported it as a new species, *S. deightonii* M.B. Ellis (1958), based on collections from Sierra Leone. It was reported from Japan by Matsushima (1975) and from New Zealand by Hughes (1978) and, in addition to the type locality in the U.S.A., is also known from Canada, Trinidad, India, Australia, Java and Papua New Guinea (herb. IMI, unpubl.). The present collection has slightly broader conidia than those described by Ellis, Hughes and Matsushima.

Illustrations: Ellis (1958, as *S. deightonii*, 1971), Matsushima (1975).

SPORIDESMIUM DOLIIFORME Minter & Hol.-Jech., *Folia geobot. phytotax.* **16**: 210 (1981). (Fig. 9B)

Conidiophores 80–210 µm high, 6–9 µm wide, with up to 4 obclavate proliferations at the apex. *Conidia* obovoid to clavate, abruptly truncate at the 3–4.5 µm wide base, 1–3-euseptate, 18–32 µm long, 10–14 µm wide.

Specimens examined: On dead stems of *Arundinaria alpina*, Naro Moru track, Mt Kenya, Kenya, 22 Jan. 1984, P.M. Kirk 1372b, 1376b, 1377a, IMI 284775b, 284779b, 284780a.

Minter & Holubová-Jechová (1981) described *Sporidesmium doliiforme* Minter & Hol.-Jech. from a decaying cone of *Pinus mugo* Turra collected in Czechoslovakia. Additional collections on decaying cones of *Pinus* sp. from the British Isles and Finland were also cited and it was surprising, therefore, that it should be found on dead stems of *Arundinaria alpina* from Mt Kenya. The present collection differs from the holotype only in the absence of conidia with more than 3 septa and consequently a correspondingly shorter maximum for conidium length.

Illustrations: Minter & Holubová-Jechová (1981).

SUBULISPORA CYLINDROSPORA P.M. Kirk, sp.nov. (Fig. 10A)

Coloniae effusae, pilosae, pallide brunneae, inconspicuae. Mycelium partim superficiale, partim in substrato immersum, ex hyphis laevibus, ramosis, septatis, pallide brunneis 1.5–3 µm latis compositum. Conidiophora macronemata, mononemata, solitaria, erecta, simplicia, recta, ad apicem geniculata, laevia, septata, pallide brunnea, ad apicem pallidiora, 24–68 µm alta, 2–2.5 µm lata, ad fundamentum leviter inflata 5–6 µm lata. Cellulae conidiogenae in conidiophoris incorporatae, terminales, sympodiales. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio schizolytica. Proliferatio holoblastica vel enteroblastica et sympodialis. Conidia acrogena, solitaria, dein acropleurogena, laevia, hyalina, cylindrica, leviter angustata, ad apicem

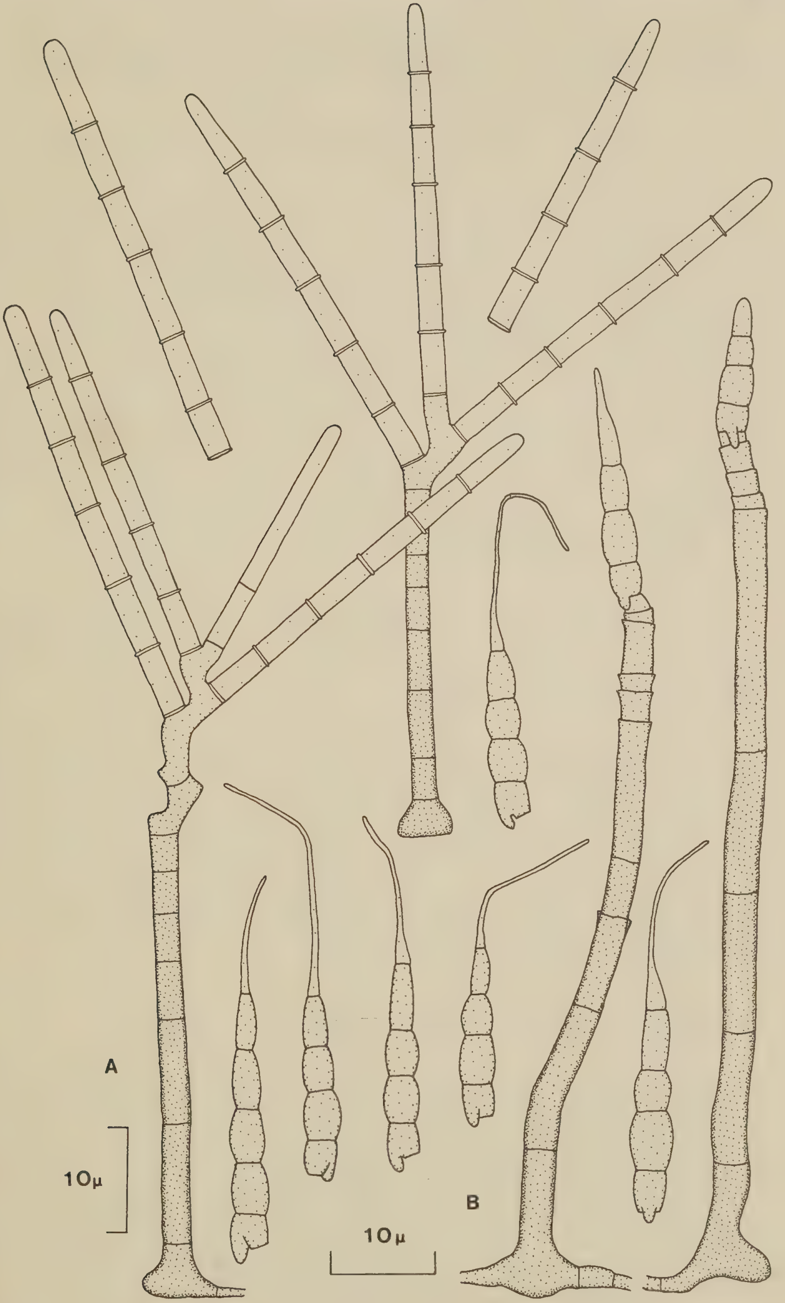

Fig. 10. (A) *Subulispora cylindrospora* (Holotype). (B) *Teratosperma microspora* (Holotype).

rotundata, ad fundamentum abrupte truncata et cicatricem incrassatam et coloratem ferentia, (4–) 5 (–7)-septata, cum septis incrassatis et refractivis visu, (32–) 37–56 (–64) µm longa, 1.8–2.2 µm lata.

In folio emortuo arboris ignotae, P.M. Kirk 1509, IMI 285177, holotypus.

Colonies effuse, hairy, pale brown, inconspicuous. *Mycelium* partly superficial, partly immersed in the substratum, composed of smooth, branched, septate, pale brown hyphae 1.5–3 µm wide. *Conidiophores* macronematous, mononematous, solitary, erect, simple, straight, geniculate towards the apex, smooth, septate, pale brown, paler towards the apex, 24–68 µm high, 2–2.5 µm wide, 5–6 µm wide at the swollen base. *Conidiogenous cells* integrated, terminal, sympodial. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* holoblastic or enteroblastic sympodial. *Conidia* acrogenous, solitary, later acropleurogenous, smooth, hyaline, cylindrical, slightly tapered, rounded at the apex, abruptly truncate at the base which bears a thickened, slightly pigmented scar, (4–) 5 (–7)-euseptate, septa thick, appearing refractive, (32–) 37–56 (–64) µm long, 1.8–2.2 µm wide.

Specimens examined: On dead leaf, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1509, IMI 285177, holotype; on dead leaves of *Eucalyptus* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1549, 1551b, IMI 285398, 285400b.

The present species is close to **Subulispora africana** (Morgan-Jones, Sinclair & Eicker) P.M. Kirk, comb. nov. (basionym: *Parasympodiella africana* Morgan-Jones, Sinclair & Eicker, *Mycotaxon* **17**: 312, 1983). It differs from this species in the characters of its conidia which are only 31–33 µm long and 3–4-septate in *S. africana. Parasympodiella* is characterized by catenate conidia and these are found in both *P. laxa* (Subram. & Vittal) Ponnappa (1975) and *P. clarkii* B. Sutton (1978a), although for other reasons these two taxa are probably not closely related.

SUBULISPORA ELEGANTISSIMA P.M. Kirk, sp.nov. (Fig. 11A)

Coloniae effusae, pilosae, pallide brunneae, inconspicuae. Mycelium partim superficiale, partim in substrato immersum, ex hyphis laevibus, ramosis, septatis, pallide brunneis ad brunneis 1.5–3 µm latis compositum. Conidiophora macronemata, mononemata, solitaria, erecta, simplicia, recta vel leviter flexuosa, ad apicem geniculata, laevia, septata, pallide brunnea, ad fundamentum quod est lobatum radialiter nonnumquam fusciora, ad apicem pallidiora, (20–) 35–160 (–210) µm alta, (2.5–)3–4 µm lata, ad fundamentum 10–16 µm lata. Cellulae conidiogenae in conidiophoris incorporatae,

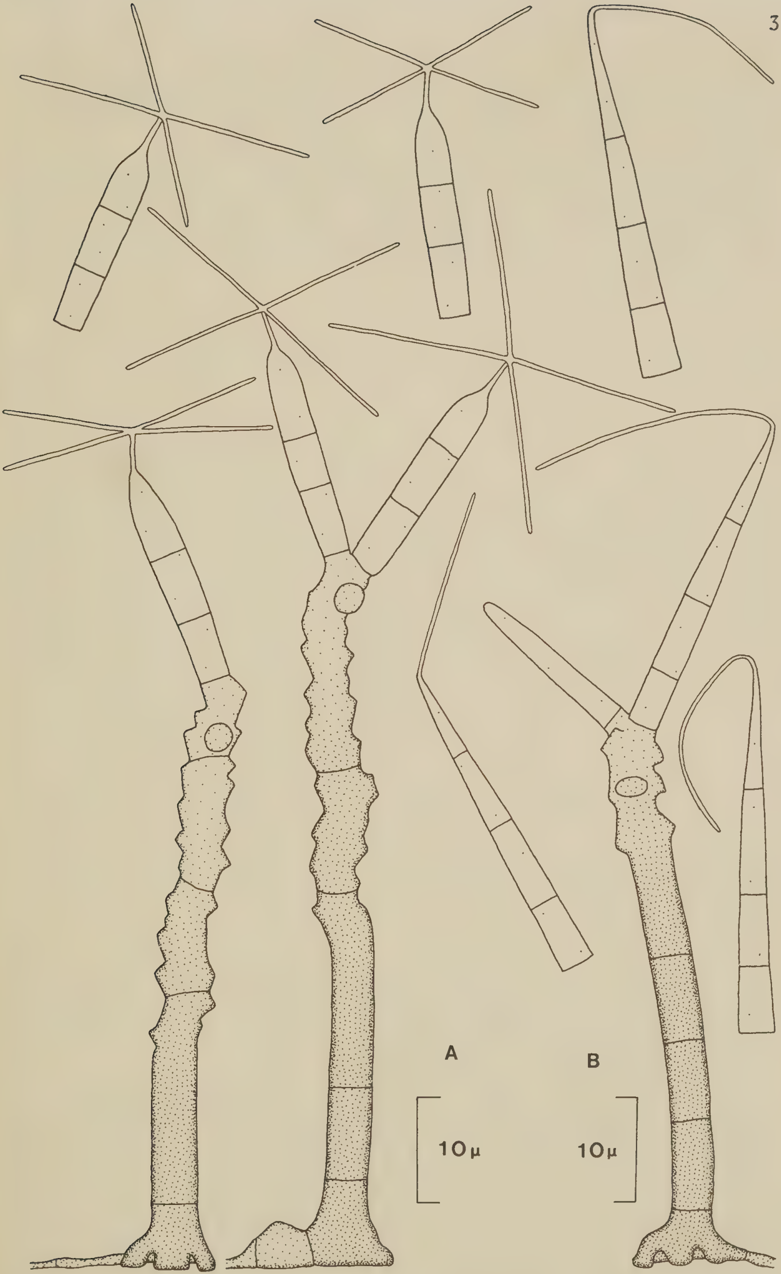

Fig. 11. (A) *Subulispora elegantissima* (Holotype). (B) *Subulispora procurvata* (P.M. Kirk 1600c).

terminales, sympodiales. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio schizolytica. Proliferatio holoblastica vel enteroblastica et sympodialis. Conidia acrogena, solitaria, dein acropleurogena, laevia, hyalina, cylindrica, ad apicem nonnihil conica, ad fundamentum abrupte truncata, 2-euseptata, quaeque cauda mirabili (picturam, precor, inspice caudae forma nonfacile latinam in liguam redita est) induta, ad fundamentum cicatrice applanata et leviter incrassata 2–3 μm lata, (15–) 18–22 (–24) μm longa (cauda exclusa), 2.5–3.5 μm lata.

In folio emortuo ?*Fici* sp., P.M. Kirk 1614, IMI 286841, holotypus.

Colonies effuse, hairy, pale brown, inconspicuous. *Mycelium* partly superficial, partly immersed in the substratum, composed of smooth, branched, septate, pale brown to brown hyphae 1.5–3 μm wide. *Conidiophores* macronematous, mononematous, solitary, erect, simple, straight or slightly flexuous, geniculate towards the apex, smooth, septate, pale brown, darker towards the sometimes radially lobed base, paler towards the apex, (20–) 35–160 (–210) μm high, (2.5–) 3–4 μm wide, 10–16 μm wide at the base. *Conidiogenous cells* integrated, terminal, sympodial. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* holoblastic or enteroblastic sympodial. *Conidia* acrogenous, solitary, later acropleurogenous, smooth, hyaline, 2-euseptate, with a thin hyaline appendage at the apex comprising a short straight section 2–4 μm long parallel with the axis of the conidium and bearing four cruciately arranged branches 14–18 μm long disposed at 90° to the axis of the conidium, with a flat, slightly thickened scar 2–3 μm wide at the base, (15–) 18–22 (–24) μm long (excluding the appendage), 2.5–3.5 μm wide.

Specimens examined: On dead leaves of ? *Ficus* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1606a, 1612a, 1614, 1623, IMI 286834a, 286839a, 286841, holotype, 286850.

The cruciate apical appendage on the conidia of *Subulispora elegantissima* serve to distinguish it from other species of *Subulispora*. Conidial ontogeny, maturation, secession and regeneration of the conidiogenous cell appear to be the same as that which occurs in *S. procurvata* Tubaki, the type species, and *S. rectilineata* Tubaki (Tubaki & Yokoyama, 1971). In both these species the apical cell of the conidium is extended distally into a filiform appendage which is, however, unbranched in both species.

SUBULISPORA PROCURVATA Tubaki, *Trans. mycol. Soc. Japan* 12: 20 (1971). (Fig. 11B)

Conidiophores 20–190 µm high, 3–4.5 µm wide. *Conidia* subulate, the apex drawn out into a fine appendage which is curved at its base such that it forms an angle of 45–150° with the body of the conidium, typically 3-euseptate, 28–40 µm long (excluding the appendage), 2–2.5 (–3) µm wide at the abruptly truncate base.

Specimens examined: On dead leaves, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1511a, 1526b, 1527b, 1529b, 1530b, 1531b, 1537d, IMI 285179a, 285194b, 285195b, 285197b, 285198b, 285199b, 285205d; on dead leaf of ?*Ficus* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1600c, IMI 286827c.

Tubaki introduced *Subulispora procurvata* Tubaki (Tubaki & Yokoyama, 1971) based on a collection on decaying leaves of *Castanopsis cuspidata* Schottky var. *sieboldii* collected in Japan. It has subsequently been reported from Guadalcanal (Matsushima, 1971), Tanzania (Pirozynski, 1972), Taiwan (Matsushima, 1980) and is also known from Brazil and India (Herb. IMI, unpubl.). In view of its occurrence in Tanzania it is not surprising, therefore, that it should occur in Kenya.

Illustrations: Ellis (1976), Matsushima (1971, 1975), Pirozynski (1972), Tubaki & Yokoyama (1971).

TERATOSPERMA MICROSPORA P.M. Kirk, sp.nov. (Fig. 10B)

Coloniae effusae, pilosae, brunneae, inconspicuae. Mycelium plerumque superficiale, ex hyphis laevibus, ramosis, septatis, pallide brunneis 1.5–2.5 µm latis compositum. Conidiophora macronemata, mononemata, solitaria, simplicia, erecta, recta vel leviter flexuosa, interdum leviter geniculata, laevia, septata, pallide brunnea, ad apicem pallidiora, 36–95 µm alta, 2–3 µm lata, per usque ad 8 proliferationes percurrentes crescentia. Cellulae conidiogenae in conidiophoris incorporatae, terminales, percurrentes. Conidiorum initium holoblasticum murificationem per apicalem. Conidiorum maturatio initio synchrona. Conidiorum secessio schizolytica. Proliferatio enteroblastica et percurrens, progressiva et annullos fingens. Conidia acrogena, solitaria, obclavata, cum cellula apicali filiformis modo caudae ad 25 µm longa, cellula ima cauda laterali 1–2 µm longa, c. 1 µm lata induta. Conidia ipsa pallide brunnea, laevia, 4 (–5)-septata, ad septa constricta, 16–20 (–24) µm longa, 3–4 µm lata.

In folio emortuo *Podocarpus milanjiana* Rendle socio *Microthyrium* sp., P.M. Kirk 1558a, IMI 285407a, holotypus.

Colonies effuse, hairy, brown, often inconspicuous. *Mycelium* mostly superficial, composed of smooth, branched, septate, pale brown hyphae 1.5–2.5 μm wide. *Conidiophores* macronematous, mononematous, solitary, simple, erect, straight or slightly flexuous, sometimes slightly geniculate, smooth, septate, pale brown, paler towards the apex, 36–95 μm high, 2–3 μm wide, with up to 8 or more percurrent proliferations at the apex. *Conidiogenous cells* integrated, terminal, percurrent. *Conidial ontogeny* holoblastic by apical wall building. *Conidial maturation* synchronous with conidial ontogeny. *Conidial secession* schizolytic. *Proliferation* enteroblastic percurrent and progressive leading to the formation of annellations. *Conidia* acrogenous, solitary, obclavate, with the apical cell drawn out into a long, hyaline, filiform appendage, the basal cell with a small lateral appendage 1–2 μm long, c. 1 μm wide, body of conidium pale brown, smooth, 4 (–5)-euseptate, constricted at the septa, 16–20 μm long, 3–4 μm wide, apical appendage up to 25 μm long.

Specimen examined: On dead leaf of *Podocarpus milanjiana* associated with *Microthyrium* sp., Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1558a, IMI 285407a, holotype.

The conidia of *Teratosperma microspora* are similar to those of *T. anacardii* Hansf. (see Ellis, 1957), a lichenicolous species (Hawksworth, 1979), but are distinctly narrower, a characteristic which distinguishes *T. microspora* from all other species of *Teratosperma*. Also, the apical cell of the conidia in the present species is drawn out into a long filiform appendage, a feature which is absent from the conidia of *T. anacardii.*

UBERISPORA SIMPLEX (Ichinoe) Piroz. & Hodges, *Can. J. Bot.* **51**: 166 (1973). (Fig. 12A)
Arachnophora simplex Ichinoe, *Trans. mycol. Soc. Japan* **13**: 57 (1972).

Conidiophores 30–140 μm high, 3–5 μm wide, 8–14 μm wide at the radially lobed base, conidiogenous branchletts 8–25 μm long, 2–3 μm wide. *Conidia* 14–22 μm diam., central cell 8–12 μm diam., apical and lateral cells 4.5–5 x 4.5–6 μm, basal cell 4.5–5 x 5–6 μm. *Synanamorph conidia* 3–6 μm long, 0.8–1.2 μm wide.

Specimens examined: On dead leaves of *Ocotea usambarensis*, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1461, 1483, IMI 285130, 285152; on dead leaf of *Podocarpus milanjiana*, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1575a, IMI 285424a.

Originally described from Japan based on collections on *Machilus thunbergii* Siebold & Zucc., *Phoenix canariensis* Horta ex Chabaud, *Phoenix*

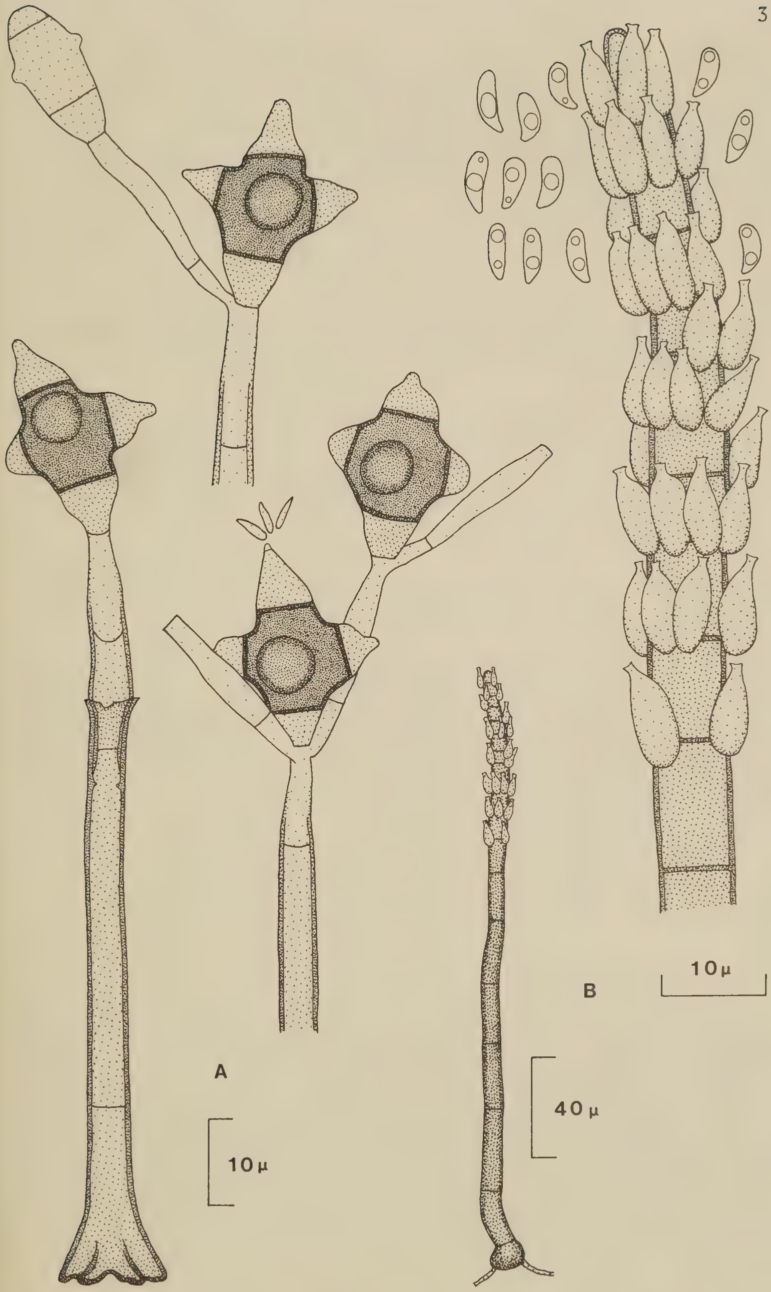
A
10µ
40µ
B
10µ

Fig. 12. (A) *Uberispora simplex* (P.M. Kirk 1461). (B) *Zanclospora brevispora* (P.M. Kirk 1597a).

loureri Kunth, *Quercus acuta* Thunb. it was redescribed from fallen leaves of *Persea borbonia* (L.) Sprengel and *Myrica carifera* L. from North Carolina, U.S.A. (Pirozynski & Hodges, 1973). Its discovery in Kenya, therefore, extends its known distribution considerably.

Illustrations: Hughes (1979), Ichinoe (1972, as *Arachnophora simplex*), Pirozynski & Hodges (1973).

ZANCLOSPORA BREVISPORA S. Hughes & Kendrick, *N.Z. Jl. Bot.* 3: 156 (1965). (Fig. 12B)

Conidiophores 180–260 μm high, 6–8 μm wide. *Conidiogenous cells* borne in whorls of 2–9 arising just below the distal septa of a series of 5–11 cells, 8–12 μm long, 2–3.5 μm wide, bearing a funnel-shaped collarette 1.5–2 μm wide, 1–1.5 μm deep. *Conidia* hyaline, usually curved, narrowly obovoid, 4–7 μm long, 1.5 (–2) μm wide.

Specimen examined: On rotten wood, Castle Forest, Mt Kenya, Kenya, 25 Jan. 1984, P.M. Kirk 1597a, IMI 285432a.

Hughes & Kendrick (1965) introduced *Zanclospora* to accommodate two lignicolous hyphomycetes from New Zealand, *Z. novae-zelandiae* S. Hughes & Kendrick and *Z. brevispora* S. Hughes & Kendrick. Neither species appears to have been reported since its description and the collection of *Z. brevispora* cited above is, therefore, of some significance.

Illustrations: Hughes & Kendrick (1965).

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ENDOTHIA GYROSA ON EUCALYPTUS IN AUSTRALIA WITH NOTES ON SOME OTHER SPECIES OF ENDOTHIA AND CRYPHONECTRIA

J. WALKER

Biology Branch, Biological and Chemical Research Institute,
Department of Agriculture N.S.W., Private Mail Bag No. 10,
Rydalmere, N.S.W., 2116, Australia

K.M. OLD

C.S.I.R.O. Division of Forest Research, Banks St.,
Yarralumla, Canberra, A.C.T. 2600, Australia

and

D.I.L. MURRAY

C.S.I.R.O. Division of Forest Research,
Wembley, 6014, Western Australia

SUMMARY

Endothia gyrosa (Schw.:Fr.) Fr. is recorded for the first time in Australia, associated with cankering on **Eucalyptus saligna** Sm.. Perithecial and conidial stromata are described. A widespread **Endothiella** sp. on several **Eucalyptus** spp. may be its anamorph. Records of species of **Endothia** and **Cryphonectria** on **Eucalyptus** from various countries are examined and comments given on the identity of the fungi. **Endothia** and **Cryphonectria** are regarded as distinct but closely related genera in the family Gnomoniaceae.

INTRODUCTION

Twig, branch and trunk cankers have been known on **Eucalyptus** spp. in Australia for many years but only within the last five have detailed attempts been made to investigate their possible causes. On **Eucalyptus** spp. planted in other countries, canker diseases have also been recorded and some fungi associated with them described. This paper reports the finding of a species of **Endothia** Fr. associated with cankers of **Eucalyptus saligna** Sm. in New South Wales, the widespread occurrence in Australia of an **Endothiella** anamorph on several **Eucalyptus** spp. and comments on some other records of **Endothia** and the closely related **Cryphonectria** Sacc. on this host genus.

A. ENDOTHIA ON EUCALYPTUS SALIGNA IN NEW SOUTH WALES

Stromata bearing perithecia were found for the first time on E. **saligna** at Currowan State Forest, Clyde Mountain, approximately 30 km north-west of Batemans Bay, New South Wales in September 1983 (DAR 49906). The fungus was fruiting on bark at the margins of vertical bark cankers extending from one to several metres up the trunk of mature trees. Perithecial stromata were found also on nearby regrowth of E. **saligna** on trees approximately 6-12 cm diam. at breast height. Several trees were dead and others showed dieback of branches and main stems. Other perithecial collections were made from trees at Termeil, about 30 km north of Batemans Bay. Conidial stromata were also present in most collections.

Examination of the perithecial fungus has shown that it is a species of **Endothia** Fr. with an accompanying **Endothiella** anamorph. Of the species treated by Shear **et al.** (1917) and Roane **et al.** (1974), it agrees closely with the description of **Endothia gyrosa** (Schw. : Fr.) Fr., the type species of **Endothia**, known previously on various genera of deciduous trees including **Quercus**, **Fagus**, **Castanea**, and **Liquidambar** in North America (Shear **et al.** 1917; Müller and von Arx, 1962; Barr, 1978). Detailed comparison of the Australian collections with specimens of various species of **Endothia** and **Cryphonectria** has confirmed their identity as E. **gyrosa**. The following is a detailed description of E. **gyrosa** based on collections from **Eucalyptus saligna** (a complete list of all specimens examined is given at the end of the paper).

Endothia gyrosa (Schw. : Fr.) Fr., **Sum. Veg. Scand.** p. 385, 1849.

Stromata present in bark on trunks, branches and twigs, often associated with cankering, 0.5-1.5 mm diam., rusty brown (Zinc Orange to Ochraceous Orange of Ridgway (1912); 5YR7/10 of Munsell (1967); Orange of Rayner (1970)), erumpent through the bark which is pushed up into flaps surrounding the stromata, containing either perithecia or conidial locules or both.

Perithecial stromata (Figs. 1-3) with 1-7, occasionally more, embedded black-walled perithecia with long necks traversing the stroma to emerge either as black ostiolar dots flush with the surface or as short beaks protruding up to 200 um above the surface and covered with a thin layer of orange stromatal tissue. In section, embedded perithecia are surrounded in their upper half by orange stromatal tissue but the lower half of the perithecial body is usually seated in bark tissue invaded by fungal hyphae but not well developed as a stroma. **Cells of stroma** pale brown, thin walled, subglobose 4-6 um diam., forming a pseudoparenchyma in its upper half, cells more

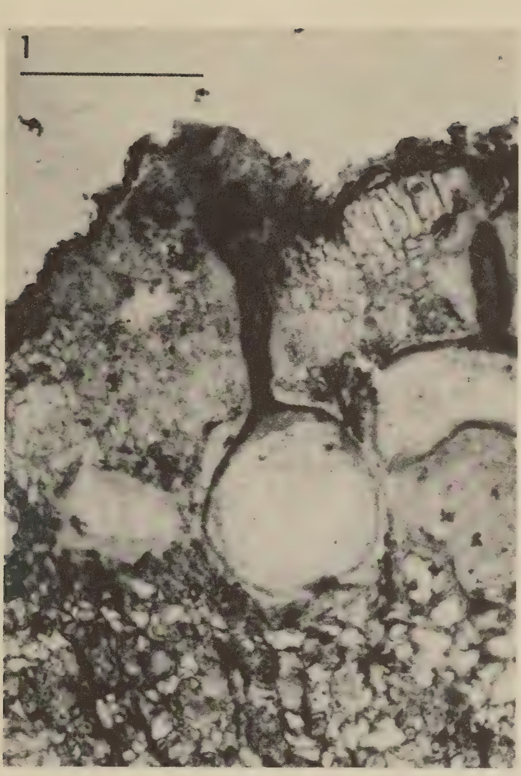

Fig. 1. **Endothia gyrosa** on **Eucalyptus saligna** : section stroma showing embedded perithecia from DAR 49906; bar = 300um.

regularly arranged in roughly vertical rows within 30-50 um of the perithecial necks and often elongated vertically up to 7 x 3 um, prosenchymatous below and mixed with bark tissue. The stromatal tissue contains scattered crystals in rhomboidal clusters up to 10-12 um diam.. **Perithecial body** globose to subglobose to ovoid with the longer axis vertical, up to 300 x 200-250 um, wall 20-25 um thick of 7-10 layers of radially flattened cells, the 3-4 outer layers 6-8 um thick composed of small dark brown cells, the inner layers 12-15 um thick of thin flattened hyaline cells, those near the neck base uncollapsed, thin walled, 12-20 x 5-7 um with their long axis arranged circumferentially. The cells of the outer wall layer form a textura epidermoidea in surface view. **Perithecial neck** set centrally on the body, to 500-600 um long, length depending on the depth of the perithecium in the stroma and bark, 35-

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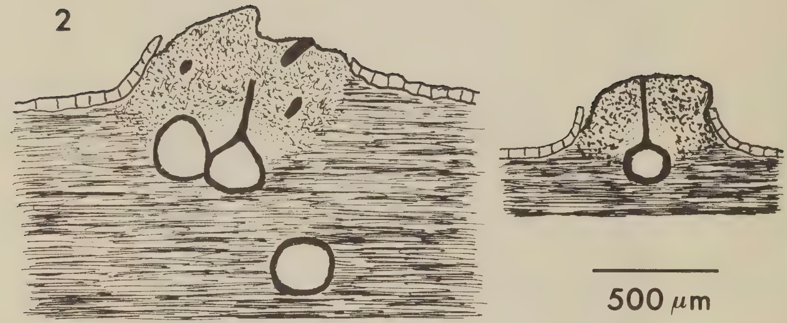

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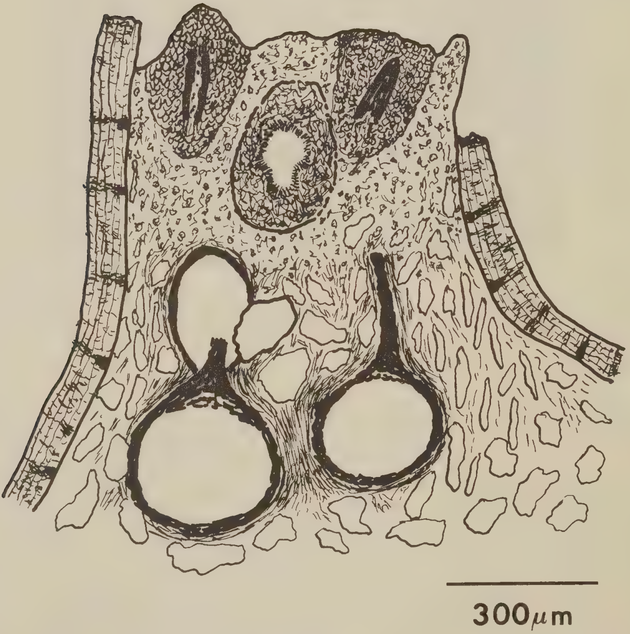

Figs. 2 and 3. **Endothia gyrosa** on **Eucalyptus saligna** from DAR 49905. Fig. 2. Sections of stomata showing perithecia embedded at different levels in stroma and bark. Fig. 3. Section stroma showing perithecia with necks and, above, a conidiogenous locule.

45 um wide, with walls 6-8 um thick and an ostiolar canal 20(25) um diam., the outer layers of the neck wall of brown interwoven hyphae 2.5-3 um diam. which run roughly parallel to, or diagonally across, the neck and form a textura intricata to textura porrecta in surface view. **Asci** (Fig. 4e) numerous, unitunicate with a minute refringent non-amyloid apical ring 2 um diam. readily observed with phase-contrast, cylindrical to fusoid, 22-33 x 4-7 um, with a very short (2-3 um) basal stalk, freed early into the perithecial cavity. **Ascospores** (Fig. 4 a,b) eight per ascus, irregularly biseriate, in mass faintly tinted very pale yellowish-green, individually hyaline, fusiform to cylindrical, usually slightly curved, unicellular, often with a small clear central vacuole,(6.5)7-11(11.5) x 1.5-2 um.

Conidial stromata similar in external appearance to perithecial stromata except for the absence of perithecial necks and black ostiolar dots, in section seen to contain convoluted locules which are lined with a cellular layer giving rise to conidiophores. Cellular layer 2-3 cells thick, cells hyaline 2-3 um diam. or up to 5 x 3 um, the outer layer producing hyaline branched **conidiophores** (Fig. 4 f) to 15(25) um long, 1-1.5 um wide, whose terminal branches are thin phialides (in the sense of Sutton, 1980). **Phialospores** (Fig. 4 c,d) hyaline to very faintly tinted yellowish-green, unicellular, rod-shaped or sometimes very slightly wider towards each end, usually slightly curved, mainly 2-4 x 1 um, a few to 6-7 um long. In some conidiomata, long sterile hyphae to 60 x 2.5-5 um arise from the hymenial layer amongst the branched conidiophores (Fig. 4 f).

The fungus has been obtained in culture from conidia and ascospores and by isolation from diseased host tissue. White to buff mycelium and small numbers of poorly developed conidiomata were formed in cultures on Difco potato dextrose agar (PDA) incubated at 25°C in darkness. Production of conidiomata was profuse on PDA cultures kept under white fluorescent light (WFL) but development of the structures remained poor and differentiation was simpler than seen in field collections. Fully developed conidiomata were formed on sterilized stem segments of **E. saligna** embedded in 4% water agar, inoculated with the fungus and incubated under WFL at 25°C. One isolate (DAR 50479) also formed perithecia in these cultures after approximately 5 months incubation under high humidity in plastic bags which were maintained in natural light at room temperature (15-25°C). Under these conditions, perithecial necks were often much longer (up to 1500 um) than noted in field collections.

In pathogenicity studies, the fungus has been shown to girdle stems of seedling **Eucalyptus maculata** Hook., **E. delegatensis** R.T. Baker, **E. regnans** F. Muell. and **E. grandis** W. Hill ex Maiden (Old **et al.**,1985). **Eucalyptus saligna** was apparently more resistant to the fungus than

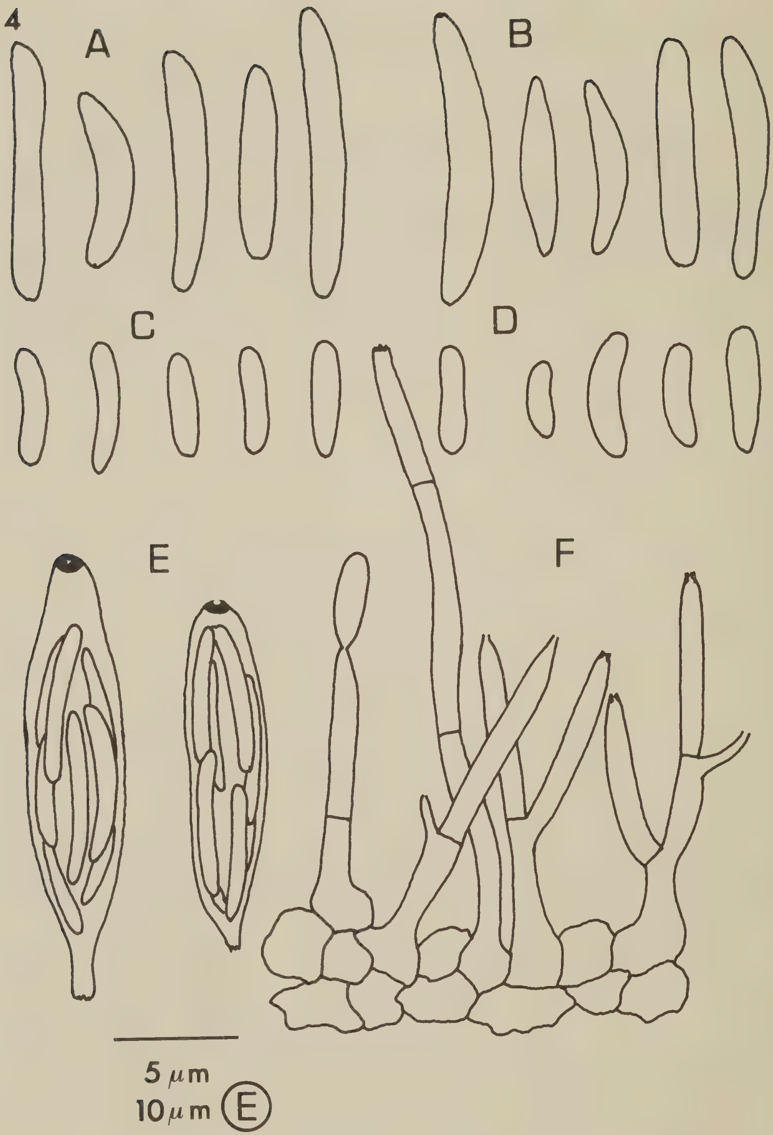

Fig. 4. **Endothia gyrosa** on **Eucalyptus saligna** : A. Ascospores, DAR 49905. B. Ascospores, DAR 49904. C. Conidia, DAR 49905. D. Conidia, DAR 49904. E. Asci and ascospores, DAR 49905. F. Conidiophores, conidiogenous cells and sterile hypha, DAR 49905.

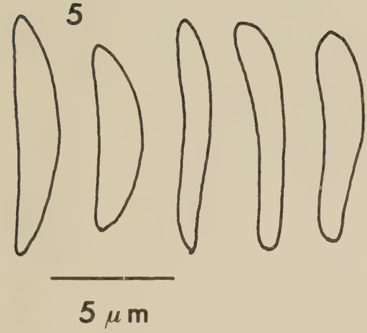

Fig. 5. **Endothia gyrosa** on **Liquidambar** : Ascospores, DAR 49897.

these species and the precise cause of the dieback of the regrowth **E. saligna** observed at Currowan State Forest is not known.

The Australian collections on **Eucalyptus saligna** agree in all essential characters with the description of **Endothia gyrosa** given by Shear **et al.** (1917). The related **E. singularis** (H. & P. Sydow) Shear & Stevens apud Shear, Stevens & Tiller (1917), which occurs on **Quercus** spp. in North America, has much larger stromata (Shear **et al.** 1917). Of several collections labelled '**Endothia gyrosa**' in Herb. BPI examined, only one (on **Liquidambar**) was found with perithecia, all the rest having **Endothiella** conidiomata only. The asci and ascospores (Fig. 5) in this collection were very similar to those on **Eucalyptus**. The rusty brown stroma is slightly less well developed in the **Eucalyptus** fungus, and the lower part of the body of the perithecia and, in a few cases, the whole body (Fig. 2) is seated in bark tissue rather than in the well developed stroma. However, in specimens of several species of **Cryphonectria** and **Endothia** examined, some variation in the amount of stroma developed in different collections of the same species was seen. Shear **et al.** (1917) also commented on variation in stromatic development in several species now placed in **Endothia** and **Cryphonectria**. It is possible that both environmental factors and the nature of the host's bark could be partly responsible for these variations.

With its unicellular, fusiform to cylindrical, straight or slightly curved ascospores, E. **gyrosa** is quite distinct from species of **Cryphonectria**, including C. **havanensis** (Bruner) Barr, found in Cuba, and C. **cubensis** (Bruner) Hodges, found on several species of **Eucalyptus** in Central and South America and Hawaii (see below). Both these species have elliptical two-celled ascospores (Figs. 6,7) which are wider than those of E. **gyrosa**. In gross appearance of the stromata, E. **gyrosa** and C. **havanensis** are similar but C. **cubensis** is quite distinct (Hodges, 1980)

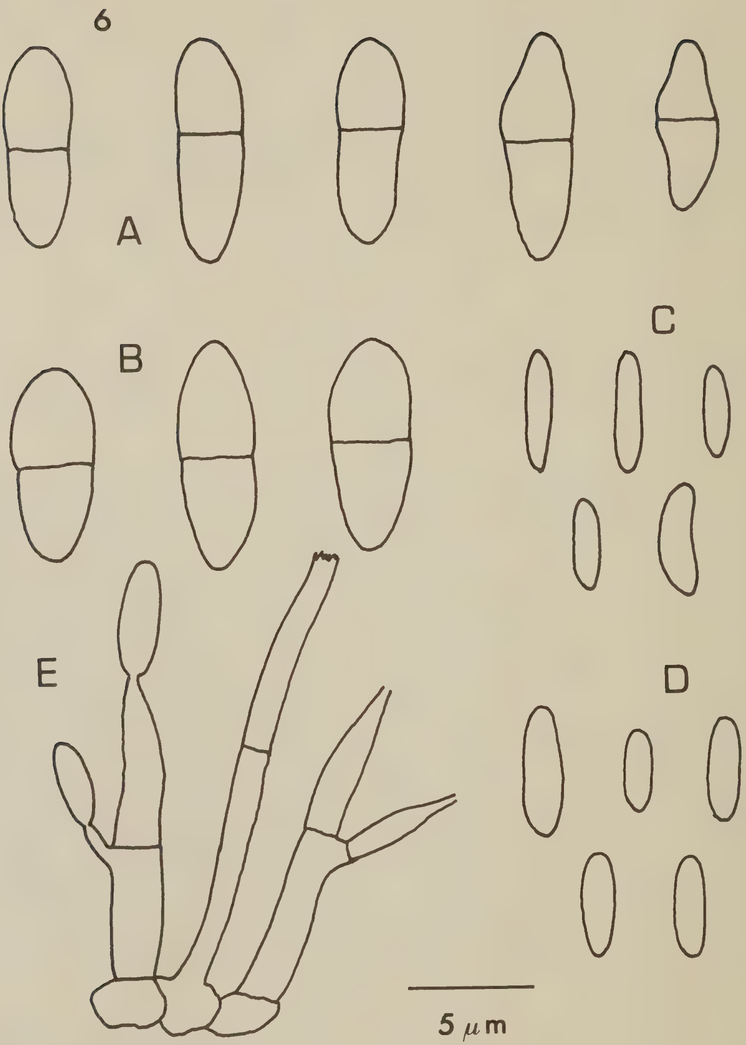

Fig. 6. **Cryphonectria havanensis** on **Eucalyptus** : A. Ascospores, DAR 49898. B. Ascospores, DAR 49900. C. Conidia, DAR 49898. D. Conidia, DAR 49901. E. Conidiophores, conidiogenous cells and sterile hypha, DAR 49901.

with very little stromatal development, long-necked perithecia partly or completely embedded in the host's bark and long beaked pycnidia for the most part superficial on the bark above the perithecia.

Whilst **Endothia** and **Cryphonectria** are separated readily on ascospore characters, some species cannot be distinguished by their anamorphs. During the present work, it was not possible to distinguish the anamorphs of E. **gyrosa, C. havanensis** and C. **radicalis** (Schw. : Fr.) Barr. All have rusty orange stromata 1-3 mm diam. containing convoluted pycnidial locules lined with a cellular layer giving rise to branched conidiophores bearing thin phialides which produce hyaline straight or slightly curved cylindrical conidia 3-4(5) x 1(1.5) um (Figs. 4,6). Several collections labelled **'Endothia gyrosa'** from both North America and Europe in Herb. BPI contained only conidiomata and their identification as E. **gyrosa** is uncertain. In four European collections (on **Carpinus, Castanea** and **Quercus**) labelled **'Endothia gyrosa'**, perithecia were found enabling them to be determined as C. **radicalis**, but in the absence of perithecia, other collections so labelled cannot be placed with any certainty and are determined and listed here as **Endothiella** sp. The long sterile hyphae seen in the conidial locules of E. **gyrosa** were very variable in occurrence between stromata. It is not known whether they are a constant morphological feature of this species or develop only in mature or overmature conidiomata. Shear **et al.** (1917) mention similar hyphae in the conidial locules of C. **parasitica** (Murrill) Barr (as **Endothia**) as 'more elongated filaments sometimes reaching 50 u or more being frequently found among the normal sporophores'.

So far in Australia, the teleomorph of E. **gyrosa** has been found only on **Eucalyptus saligna** in the South Coast district of New South Wales. However, an anamorph indistinguishable from the anamorph of E. **gyrosa** has been found more widely on several **Eucalyptus** spp. in New South Wales, Tasmania and Western Australia. In south-eastern Australia, an identical **Endothiella** has been isolated from stem cankers on 15 species of **Eucalyptus** (Old **et al.**,1985). In some instances, it was fruiting on living or dead shoots; in others, isolations were made from excised chips of bark or sapwood from canker margins. Davison (1982) and Davison and Tay (1983) have reported this anamorph from Western Australia on jarrah (E. **marginata** Donn ex Sm.) and other **Eucalyptus** spp. These authors concluded that it was the anamorph of **Endothia havanensis** Bruner (here called **Cryphonectria havanensis**). However, the present work has indicated that it is not possible to distinguish some species of **Endothia** and **Cryphonectria** in their anamorphic (**Endothiella**) states and the fungus reported from Western Australia could just as well be the anamorph of E. **gyrosa**. Specimens examined from Western Australia could not be distinguished from the E. **gyrosa** anamorph found in New

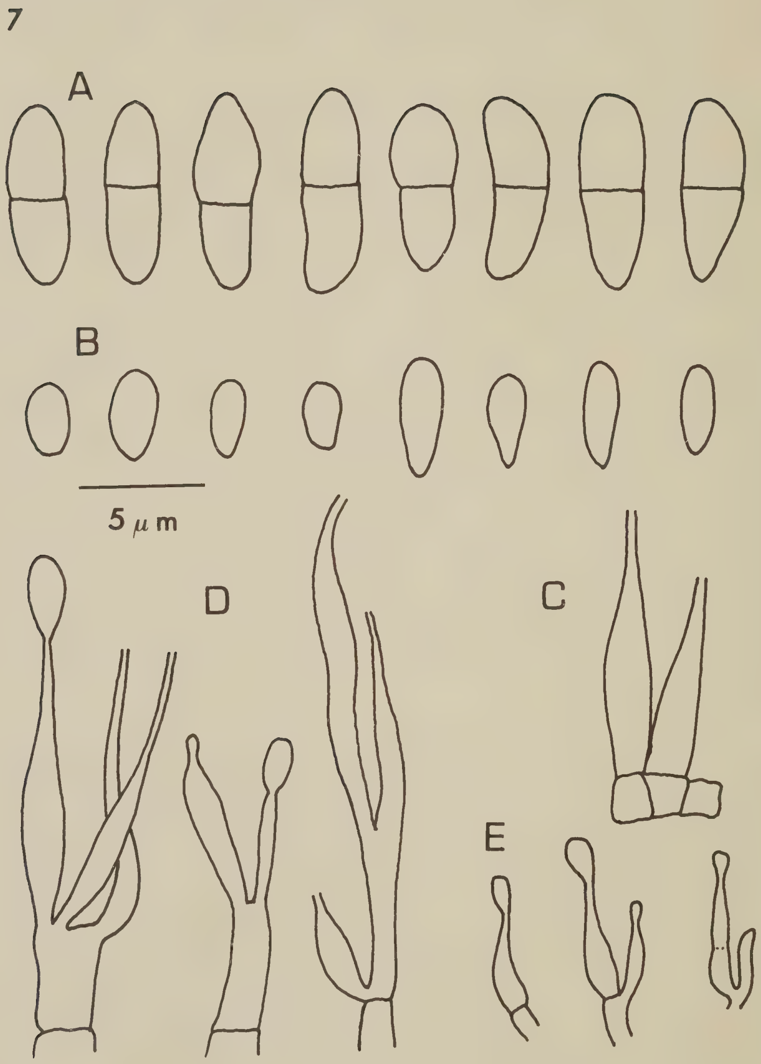

Fig. 7. **Cryphonectria cubensis** : A. Ascospores, DAR 49903. B. Conidia, DAR 49903. C. Conidiogenous cells, DAR 49903. D. Branched conidiogenous cells, DAR 49902. E. Tracing of drawings of conidiogenous cells, slightly reduced (from Bruner, 1917). Scale only applies A-D.

South Wales. The exact identity of the Western Australian fungus on jarrah and other **Eucalyptus** spp. must await the finding of a teleomorph (or teleomorphs). The same applies to similar collections of **Endothiella** found in New South Wales and Tasmania. Each collection can be identified only as far as the available spore states permit. At the moment, there is no conclusive evidence for the presence of C. **havanensis** in Australia.

The finding of **Endothia gyrosa** in New South Wales is the first authentic record of the genus in Australia. It is of some interest that a species known previously only on several genera of North American deciduous trees should now be found on **Eucalyptus** in Australia. This raises the question of the relationship between the North American and Australian fungus. Whilst the stromata in the Australian collections are slightly less developed and generally contain fewer perithecia than those seen in, and described for, the North American fungus (Shear **et al.**,1917), the two are identical in all essential details of size and shape of perithecia, asci, ascospores, conidiogenous cells and conidia and there is no morphological basis for considering the Australian fungus as a taxon distinct from E. **gyrosa**. Species of **Quercus**, and **Liquidambar styraciflua** L., which are hosts of E. **gyrosa** in North America, are grown commonly as ornamental trees in many parts of Australia, and a search for E. **gyrosa** on these species would be worthwhile. Shear **et al.** (1917) regarded E. **gyrosa** as a weak parasite but Roane **et al.** (1974) reported it as the cause of a devastating canker disease, called pin oak blight, of **Quercus palustris** Muenchh.. A more detailed pathological and chemical comparison of collections from Australia and North America would be of considerable interest.

B. COMMENTS ON THE GENERA **ENDOTHIA** AND **CRYPHONECTRIA** AND SOME SPECIES ON **EUCALYPTUS**

As a background to the comments that follow, a brief outline of the history of **Endothia** Fr. and **Cryphonectria** Sacc. is given, with records of species in these genera recorded on **Eucalyptus**.

1. Brief historical review

The genus **Endothia** Fries (1849) was established with **Sphaeria gyrosa** Schweinitz (1822), described from **Fagus** and **Juglans** in North America, as the type species. Fries (1823) had listed S. **gyrosa** in his Tribe Confluentes of the genus **Sphaeria**. **Endothia gyrosa** has well developed reddish-brown stromata in which both perithecia and conidial locules develop. Asci are unitunicate with a non-amyloid apical refractive ring characteristic of the Diaporthales and contain unicellular hyaline or very faintly tinted cylindroid to allantoid ascospores (Shear **et al.**, 1917; Barr, 1978). Since the genus was described by Fries, several other species have been included and a comprehensive treatment has been given by Shear **et al.** (1917). These authors accepted species with both non-septate and one- septate ascospores in the genus which they split into two sections on this basis. Their concept of **Endothia** has been followed by some later authors (Müller and von Arx, 1962; Kobayashi, 1970). However, Saccardo (in Saccardo and Saccardo, 1905) had established the genus **Cryphonectria** Sacc., based on **Nectria gyrosa** Berkeley & Broome (1877), for species with one-septate ascospores. Barr (1978), in a recent treatment of the North American Diaporthales, has maintained this distinction and has further separated **Endothia** and **Cryphonectria** into different families, based largely on the structure of the stroma and the placement of perithecia in it. With the recently recognised **Endothia metrosideri** (Roane & Fosberg) Barr (1983), there are currently five species accepted in **Endothia** in this narrow sense and six species in **Cryphonectria** (Roane **et al.**,1974; Barr,1978).

On **Eucalyptus** spp., there are several reports of **Endothia**-like fungi from various countries. **E. havanensis** Bruner (1916) was described from the bark of dead or injured trees of **Eucalyptus** spp. in Cuba and the author also reported what was thought to be the anamorph of this species on mango, avocado and jobo (**Spondias mombin** L.). The fungus was described with orange-coloured stromata, an **Endothiella**-like anamorph and two-celled ascospores. Because of this, Barr (1978) placed it as **C. havanensis** (Bruner) Barr. Hodges (1980) considered that it was not different from the type species of **Cryphonectria, C. gyrosa**, based on **N. gyrosa** from Sri Lanka, and he reduced **E. havanensis** to synonymy under C. **gyrosa** (Berk. & Br.) Sacc.. The type of the Berkeley and Broome species was not examined, although he did see collections from Sri Lanka studied by Shear and Stevens under the name **E. tropicalis** (see below). As mentioned above, Davison (1982) and Davison and Tay (1983) reported **C. havanensis** (as **E. havanensis**) from Australia on several **Eucalyptus** spp. based on an **Endothiella** anamorph but there is no firm evidence at present for this conclusion.

A second fungus, **Diaporthe cubensis** Bruner (1917) on **Eucalyptus** spp. was described from Cuba, associated with a canker disease. This species had very little stromatic development; perithecia were embedded in the bark with pycnidia seated superficially above them. Both had long necks and ascospores were two-celled. Hodges (1980) studied Bruner's species and, in spite of the very slight stromatic development, concluded that it would be placed better as C. **cubensis** (Bruner) Hodges. This species has been reported on several **Eucalyptus** spp. from Brazil, Florida, Hawaii, Puerto Rico, Surinam, Trinidad and Western Samoa (Hodges **et al.**,1979; Hodges,1980).

Another name that must be considered in this context is **Endothia tropicalis** Shear & Stevens, apud Shear, Stevens

& Tiller (1917). This name was introduced for the fungus now known as C. **gyrosa** (Berk. & Br.) Sacc. (based on **Nectria gyrosa** Berk. & Br.). The epithet '**gyrosa**' was preoccupied in **Endothia** by **E. gyrosa** (Schw. : Fr.) Fr., the type species of the genus (based on **Sphaeria gyrosa** Schw. : Fr.). If **Nectria gyrosa** Berk. & Br. is to be placed in the genus **Endothia,** a new epithet would be needed for it, and Shear and Stevens (Shear **et al.**,1917) provided the epithet '**tropicalis**' for this purpose. However, if **N. gyrosa** is placed in **Cryphonectria,** then the epithet '**gyrosa** Berk. & Br.' is available for use.

2. Comments

With this historical summary in mind, the following comments are offered:

(a) **Endothia** and **Cryphonectria**

Examination of specimens of **Endothia gyrosa, Cryphonectria havanensis** and C. **radicalis** indicates that **Endothia** and **Cryphonectria** are closely related genera, with similar anamorphs. They seem to differ only in the septation and shape of their ascospores and it is on this basis that they are maintained as separate genera here. It is felt that their placement in two separate families by Barr (1978) obscures this close relationship. She placed **Endothia** in the Gnomoniaceae, characterised by upright perithecia with central beaks erumpent separately and **Cryphonectria** in the Valsaceae characterised by perithecia which are oblique or horizontal with oblique or lateral beaks, erumpent separately or converging through a stromatic disc. In addition, **Endothia** was said to have a pseudoparenchymatous stroma and **Cryphonectria** a plectenchymatous one.

The present work does not support these distinctions. In both **E. gyrosa** and C. **havanensis,** the stromata appear to be complex and composed of various tissue types, with both pseudoparenchymatous and plectenchymatous elements in each species. The perithecia in both are generally upright rather than oblique or horizontal and the beaks are centrally placed, except in perithecia towards the edge of the stroma where their position sometimes requires a more or less eccentric beak. In both species the necks are separately erumpent at right angles to the surface. In their anamorphs, they could not be distinguished. Examination of the descriptions and illustrations in Shear **et al.** (1917) and Kobayashi (1970) of various species now placed as **Endothia** or **Cryphonectria** on the basis of spore shape and septation supports these conclusions. Although an examination of the type specimens of the two genera has not been made here, and is indeed essential in this context, the present work on teleomorphs and anamorphs suggests that **Endothia** and **Cryphonectria** should be placed close together in any classification and are probably accomodated better amongst stromatic Gnomoniaceae than in the Valsaceae.

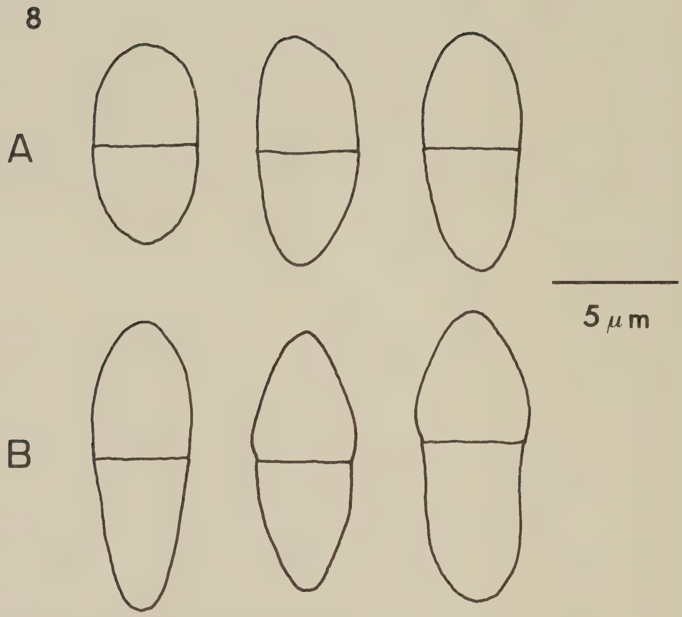

Fig. 8. **Cryphonectria gyrosa**. A. Ascospores, DAR 14534 B. Ascospores, DAR 49895.

(b) **Cryphonectria cubensis**

Hodges (1980) transferred **Diaporthe cubensis** Bruner (1917) to the genus **Cryphonectria**. In doing this, he acknowledged that it has very little stromatic development but he did not consider this a 'characteristic significant enough to warrant erection of a new genus'. **Cryphonectria cubensis** also differs from several other species placed in **Cryphonectria** in its anamorph. It forms almost superficial pycnidia (Bruner, 1917; Hodges, 1980) with a generally simple or slightly convoluted ('sublaberintica' of Bruner, 1917) cavity in contrast to the usually highly convoluted conidial locules of **Cryphonectria** spp. (Shear **et al.**, 1917; Kobayashi, 1970). However, as these authors point out for C. **radicalis**, sometimes simple pycnidia with little stroma can be produced. The conidiogenous apparatus of C. **cubensis** figured by Bruner (1917) and observed during the present work is slightly different from that of C. **havanensis** and E. **gyrosa**. Generally in C. **cubensis**, the elongated phialidic conidiogenous cells arise from a basal cell rather than from branched conidiophores (Fig. 7). However, some branching was seen and Hodges (in litt.) indicated that branched conidiophores are common in many specimens of C. **cubensis**. A more detailed comparison of these anamorphs is required. For the present, the treatment of C. **cubensis** by Hodges (1980) is accepted, but the possibility that it would be more suitably placed in another genus should be investigated.

(c) **Cryphonectria havanensis** and C. **gyrosa**

Although Barr (1978) retained these as separate species, Hodges (1980) regarded them as the same, under the earlier name C. **gyrosa**. Kobayashi (1970) also considered C. **gyrosa** (as **Endothia tropicalis**) synonymous with C. **havanensis** (as **Endothia havanensis**). None of these authors appears to have studied the Berkeley and Broome type of C. **gyrosa** and it has not been examined during the current work. However, the two species are kept separate here for the following reasons:-

(i) until the types are studied and compared, no sound nomenclatural decisions can be taken

(ii) comparison of the description and ascospore illustrations of C. **gyrosa** given by Shear **et al.** (1917, as **E. tropicalis**) with those of C. **havanensis** given by Bruner (1916, as **E. havanensis**) show that Shear **et al.** (1917) described C. **gyrosa** with subelliptical ascospores not constricted at the septum whereas Bruner (1916) described the ascospores of C. **havanensis** as fusoid and constricted at the septum. Both give very similar size ranges for the two species (7.5-10.5 x 3.5-5 um for C. **gyrosa** and 7.47-9.54 x 2.29-4.15 um for C. **havanensis**). The two specimens considered to be C. **gyrosa** examined in the present work had ascospores 10-11 x 4-4.5 um, mostly not constricted at the septum but a few spores with very slight constriction (Fig. 8). In the Bruner specimens of C. **havanensis** examined, the spores were generally narrower (not wider than 3.5 um) and constriction at the central septum varied from none to slight (Fig. 6). None as constricted as those illustrated by Bruner (1916) were seen.

(iii) in their original description of **Nectria gyrosa** (the basionym for C. **gyrosa**), Berkeley and Broome (1877) gave the ascospores as .0003-.0004 inches long and .00015-.0002 inches wide. This is 7.5-10 x 3.75-5 um. The spores were described as elliptical and uniseptate. This description and measurement could apply to C. **havanensis**. However, both Müller and von Arx (1962) and Barr (1978) gave smaller ascospore measurements for C. **gyrosa** (Müller and von Arx, 3.5-7 x 2.5 um, as **E. tropicalis**; Barr, 3.5-7 x 2-2.5 um). Hodges (1980) stated that Barr's measurements were based on a specimen of C. **cubensis** he collected in Brazil but no explanation was given for the similar measurements quoted by Müller and von Arx (1962).

Until these anomalies are sorted out by examination of the type and other collections, it is best to retain C. **havanensis** and C. **gyrosa** as separate species.

Specimens examined:

Cryphonectria cubensis. (Bruner) Hodges : on **Eucalyptus botryoides** Sm., Santiago de las Vegas, Cuba, 25.iii.1916, C.L. Shear 2889, **NEOTYPE** (Hodges, 1980) BPI (slide as DAR

49903). On **Eucalyptus saligna**, Kauai, Hawaii, U.S.A., 14.vi.1978, C.S. Hodges, DAR 35434; **Eucalyptus** sp., Santiago de las Vegas, Cuba, 29.i.1914, S.C. Bruner, ex Herb. J.A. Stevenson 2111, BPI (slide as DAR 49902).

Cryphonectria gyrosa (Berk. & Br.) Sacc. : on **Elaeocarpus dentatus** (J.R. & G. Forst.) Vahl, Omahuta Forest, North Auckland Province, New Zealand, 19.vi.1964, S.J. Hughes, ex DAOM 93506a (dupl. as DAR 14534) (formerly as **Endothia tropicalis** Shear & Stevens); on dead twigs, Olinda pipe line, Maui, Hawaii, U.S.A., 21.xii.1927, C.L. Shear, BPI (slide as DAR 49895; Petrak (1953) as **Endothia gyrosa** (Schw.) Fr.).

Cryphonectria havanensis (Bruner) Barr : on **Eucalyptus** sp., Santiago de las Vegas, Cuba, 15.ii.1916, S.C. Bruner, Est. Exp. Agro. de Cuba No. 740, **TYPE**, BPI (slide as DAR 49898); same host, locality and date, S.C. Bruner and C.L. Shear 2888, possibly **ISOTYPE**, BPI (slide as DAR 49900); same host and locality, 28.iii.1916, C.L. Shear 2893, BPI (slide as DAR 49901, **Endothiella** anamorph only).

Cryphonectria radicalis (Schw. : Fr.) Barr : on **Carpinus** sp., Treviso, Italy, no date given, P.A. Saccardo, BPI (slide as DAR 49925); Tiflis, Russia, no date given, Woronow, BPI (slide as DAR 49926). On **Castanea vesca** Gaertn., Stresa, Italy, 22.v.1912, C.L. Shear 1656, (slide as DAR 49923). On **Quercus** sp., Veneto, Italy, 2.ii.1912, P.A. Saccardo, BPI (slide as DAR 49912) (all in BPI as '**Endothia gyrosa** (Schw.) Fr.').

Endothia gyrosa (Schw. : Fr.) Fr. : on **Eucalyptus saligna**, Termeil, N.S.W., Australia, 5.x.1983, K. Old 5, DAR 49904; Currowan, Clyde Mountain, N.S.W. 10.vi.1984, K. Old, DAR 49905; same locality, 20.ix.1983, K. Old, DAR 49906; same locality, 5.x.1983, K. Old, DAR 49907; Termeil, N.S.W., 5.x.1983, K. Old 2, DAR 49909. On **Liquidambar** sp., Grenada, Miss., U.S.A., 19.ii.1914, C.L. Shear and N.E. Stevens 2221, BPI (slide as DAR 49897).

Endothia singularis (H. & P. Sydow) Shear & Stevens : on **Quercus gunnisonii** (Torr.) Rydb., Pagosa Springs, Colo, U.S.A., 23.v.1917, G.G. Hedgcock and E. Bethel, F.P. No. 24744 ex BPI (dupl. as DAR 11235). On **Quercus** sp., Palmer Lake, Colo., U.S.A., 7.ix.1912, G.C. Hedgcock and E. Bethel, F.P. No. 3830 ex BPI (dupl. as DAR 11602).

Endothiella spp. : in these collections, only conidiomata were found. Several are filed under teleomorphic names in various herbaria. For ease of reference, they are listed in two sections - Australia and Overseas.

1. Australian collections : on **Eucalyptus maculata** Hook., Durras, N.S.W., 28.vi.1980, K. Old, DAR 35046; same locality, 1980, K. Old, DAR 35232. On **E. marginata**, Karnet Block, Bedfordale, Western Australia, Feb., 1981, E.M.

Davison DCE 206, IMI 256999, DAR 35005 (culture only); Churchman's Block, Bedfordale, Western Australia, Sept., 1981, E.M. Davison, DAR 35006a (culture only); Jarrahdale, Western Australia, April 1981, E.M. Davison DCE 211, DAR 41730 (three collections on E. **marginata** formerly as '**Endothia havanensis** Bruner', see Davison 1982). On E. **obliqua** L'Herit., Lisle, Tasmania, 14.xi.1983, K. Old, DAR 49435. On E. **regnans** F. Muell., near Scottsdale, Tasmania, 15.xi.1983, K. Old, DAR 49910a; same locality, 14.xi.1983, K. Old, DAR 49436. On E. **saligna** wood chips, Termeil, N.S.W., 14.i.1982, K. Old, DAR35086. On **Tibouchina** sp. cult., Baulkham Hills, N.S.W., 1.vii.1984, J. Walker 84/88, DAR 49919.

2. Overseas collections : on **Castanea dentata** (Marsh.) Borkh., Wauhatchie, Tenn., U.S.A., 9.ii.1913, N.E. Stevens, BPI; Luray, Tenn., U.S.A., 17.vi.1913, N.E. Stevens 2014, BPI. On **Castanea** sp., Veneto, Italy, 2.ii.1912, P.A. Saccardo, BPI (slide as DAR 49913). On **Fagus** sp., Clifty Falls, Ind., U.S.A., 1.iv.1939, N.E. Stevens, BPI (slide as DAR 49927); Francis, Md, U.S.A., 29.viii.1913, N.E. Stevens 2170, BPI; Farmington, N.Y., U.S.A., Sept. 1889, E. Brown 212, BPI; Spiceland and Newcastle, Ind., U.S.A., April 1939, N.E. Stevens, BPI. On **Liquidambar** sp., Francis, Md, U.S.A., 29.viii.1913, N.E. Stevens 2171, BPI; Pee Dee, N.C., U.S.A., 24.iii.1926, C.L. Shear, BPI; Baton Rouge, La, U.S.A., 4.iv.1915, C.L. Shear, BPI. On **Castanea** or **Quercus**, Portugal, 1910, J. Baneto, BPI (slide as DAR 49924). All these collections are filed in BPI as **Endothia gyrosa** (Schw. : Fr.) Fr.

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STUDIES ON THE TAXONOMY OF DIAPORTHE VACCINII[1]

C. P. Chao[2] and D. A. Glawe

Department of Plant Pathology
University of Illinois at Urbana-Champaign
Urbana, IL 61801

SUMMARY

Four isolates of *Diaporthe vaccinii*, one each of *Diaporthe phaseolorum* var. *caulivora* and var. *sojae*, and three *Phomopsis* isolates from soybean were studied in culture. Pathogenicity of isolates of *D. vaccinii* and *Phomopsis* were compared on blueberry and soybean. The differences in cultural behavior and host specificity suggest that *D. vaccinii* is best regarded as a species distinct from *D. phaseolorum*.

Diaporthe vaccinii Shear (anamorph: *Phomopsis vaccinii* Shear) causes stem canker and dieback, twig blight, and fruit rot on highbush blueberry (*Vaccinium corymbosum* L.), rabbiteye blueberry (*V. ashei* Reade), American cranberry (*V. macrocarpon* Ait.), and European cranberry (*V. oxycoccus* L. var. *intermedium* Gray). The fungus is known only from North America, and has been reported from many of the cranberry- and blueberry-growing areas of the continent (Shear *et al*. 1931; Weingartner and Klos, 1975; Friend and Boone, 1968).

Wehmeyer (1933) noted that the teleomorphs of *D. vaccinii* and *D. phaseolorum* (Cooke & Ellis) Sacc., particularly *D. phaseolorum* var. *batatatis* (Harter & Field) Wehm., and *D. phaseolorum* var. *sojae* (Lehman) Wehm. are morphologically similar. *Diaporthe phaseolorum* var.

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[1] Based on a thesis submitted in partial fulfillment of the requirements for the M.S. degree at the University of Illinois at Urbana-Champaign.

[2] Current address: Department of Plant Pathology and Crop Physiology, Louisiana State University, Baton Rouge, LA 70803.

sojae causes pod and stem blight, and seed decay on soybean [*Glycine max* (L.) Merrill], and occurs throughout the world (Sinclair, 1982). The similar *D. phaseolorum* var. *caulivora* Athow & Caldwell (anamorph: *Phomopsis* sp.) causes soybean stem canker in the north central U. S. A. and in Canada (Sinclair, 1982). Since *D. vaccinii* and *D. phaseolorum* are economically important plant pathogens, it is important to determine if Wehmeyer (1933) was correct in suspecting that they are conspecific. Therefore the following characteristics were used to study the taxonomic relationship of the two species: cultural characteristics, including mycelial texture and color; types of fruiting bodies produced in culture; conidial size and shape; and pathogenicity on blueberries and soybeans. The data thus obtained were evaluated in an effort to determine whether or not *D. vaccinii* and *D. phaseolorum* are conspecific.

MATERIALS AND METHODS

The nine isolates used, and their geographical origins were: BB1 and BB5, (*Diaporthe vaccinii*), from *Vaccinium corymbosum*, Union Co., Illinois, 1982; BB751, (*Diaporthe vaccinii*), from *Vaccinium corymbosum*, Ford Co., Illinois, 1983; CB, (*Diaporthe vaccinii*), from *Vaccinium macrocarpon*, Wisconsin, 1983; P1, P2, DB-P3 (*Phomopsis* sp.), from *Glycine max*, Champaign Co., Illinois, 1982; DPS, (*D. phaseolorum* var. *sojae*), ATCC 28463, from *G. max*; DPC, (*D. phaseolorum* var. *caulivora*), ATCC 28464, from *G. max*. The soybean isolates resembled the description by Kmetz and Schmitthenner (1980) of an undescribed *Phomopsis* species from soybean, and produced a *Phomopsis* state in culture, but no teleomorphs.

A variety of agar-based media and plant parts was used to culture the isolates (Chao, 1984). These media included: Difco potato dextrose agar (PDA), potato dextrose agar made according to Riker and Riker (1936) (L-PDA), PDA amended with 1.0% Difco yeast extract (PDYA), L-PDA amended with Difco yeast extract, Difco corn meal agar, corn meal mush [made by boiling corn meal in water (1 liter) and pouring into Petri plates], Difco oat meal agar, and soybean extract agar (made by boiling 50 g soybean stems in 500 ml water, filtering, adding water to filtrate to make 1 liter, and solidifying with 1.5% agar). In addition, autoclaved twigs of *Acer negundo* L., *Acer* sp., *Platanus occidentalis* L., and *Medicago sativa*

L. were inoculated with the isolates. Observations indicated that no substrate offered significant advantages over commercial PDA. Since this is a widely available medium, results presented herein are those obtained using it. Isolates were cultured in 9-cm-diam plastic culture plates and incubated with a cycle of 10 h of fluorescent light at 20 C followed by 14 h of darkness at 15 C. Microscopic mounts were made by placing small amounts of fruiting material in water and crushing them beneath coverslips.

Two pathogenicity tests were conducted on soybean cultivars Wells II and Williams 79 in R2 growth stage (Fehr _et_ _al_., 1971) in the greenhouse. Since authentic Illinois isolates of _D_. _phaseolorum_ were not available, _Phomopsis_ isolates known to be pathogenic on soybean were used to compare their pathogenicity with _D_. _vaccinii_ isolates. Test I was conducted 1 Aug. to 3 Oct., 1983; test II 3 Oct. to 3 Dec., 1983. Five plants in each treatment were inoculated with the control inoculum or one of the following isolates: BB1, BB5, P1, P2, DB-P3. Inoculum consisted of 1.5-cm segments of autoclaved toothpicks (Crall, 1952) which had been placed on PDA cultures of the respective fungi, or on sterile PDA for the control. Inoculations were made by inserting the mycelium-covered toothpicks into slits made in stems between the second and third nodes. Test results were evaluated by measuring the length of discoloration in both directions from the points of inoculation. Fungi were reisolated by cutting 3-5 mm stem pieces from lesion margins, placing them in 1.6% NaOC1 for approximately 2 min, washing them in two changes of sterile water, and placing them on PDA acidified (pH 4-5) with lactic acid. Isolates were cultured on PDA as described previously.

Two pathogenicity tests were conducted on 10- to 15-yr-old 'Jersey' blueberry bushes. Test I was conducted 3 May to 5 July, 1983; test II 7 Oct. to 24 Nov., 1983. In each treatment, twelve fresh pruning wounds _ca_. 1 cm in diam were inoculated with sterile agar (control) or one of the following isolates: BB1, BB5, P1, P2, DB-P3. Inoculated sites were wrapped with aluminum foil to prevent desiccation. Test results were evaluated by measuring vascular discoloration in both directions from the points of inoculation. Fungi were reisolated as described previously.

Pathogenicity data were statistically analyzed by using the FLSD test.

RESULTS

Pathogenicity tests

Tests on blueberry: Significantly more discoloration resulted on stems inoculated with blueberry isolates (BB1, BB5) than with soybean isolates (P1, P2, DB-P3) or the control treatment (Table 1). Lengths of lesions on stems inoculated with soybean isolates were not significantly different from those of the control. Blueberry isolates were reisolated from five to eight of the twelve stems inoculated with them in each test. Attempts to reisolate the *Phomopsis* species failed. None of the isolates were reisolated from stems inoculated with sterile agar.

Tests on soybean: Lesion lengths on plants of both cultivars inoculated with BB1 and BB5 were not significantly different from those of the control (Table 2). On Williams 79, only P1 in test I and P2 in test II caused lesions significantly longer than the control. On Wells II, all soybean isolates produced lesions significantly longer than the control in both tests, and in test II P2 produced significantly longer lesions than P1 and DB-P3. Isolates P1, P2, and DB-P3 generally were reisolated successfully from both varieties, while BB1 and BB5 were reisolated only once from Wells II and not reisolated from Williams 79. None of the isolates were reisolated from control plants. Lesions caused by P1, P2, and DB-P3 were significantly longer on Wells II than on Williams 79 (Table 2).

Morphology in culture

Diaporthe vaccinii: Colonies (Fig. 1) when one-wk-old white, felty, with smooth margins; reverse coloration pale yellow to yellowish gray. Covering plates in 8-10 da, producing conidia in 15-21 da. Month-old colonies white to gray, felty, BB1 and BB5 with a cottony ring of aerial mycelium around center, reverse coloration ranging from grayish pink to purple. Conidiomata pycnidial, stromatic, black, 1-3 mm diam, forming throughout plates, exuding pinkish conidial masses. Condiogenous cells phialidic, hyaline, cylindrical, tapering, arising from pseudoparenchyma, (5.5-)9.4-14.1(-16.5) x 1.1-3.8 µm. Conidia: alpha spores, unicellular, fusiform, biguttulate, 4.5-9 x (1.3-)1.9-4.5 µm; isolates BB751 and CB

Table 1
Pathogenicity of Diaporthe vaccinii isolates BB1 and BB5, and Phomopsis sp. isolates P1, P2, and DB-P3 on Jersey blueberry.

Treatment	Mean lengths internal discoloration (mm)[y] Test I		Test II	
Control	1 b	(0)[z]	2 b	(0)[z]
P1	3 b	(0)	2 b	(0)
P2	2 b	(0)	2 b	(0)
DB-P3	2 b	(0)	2 b	(0)
BB1	17 a	(7)	40 a	(8)
BB5	17 a	(8)	36 a	(5)
LSD	7.8		18.9	

[y] Means with the same letter are not significantly different according to FLSD test at $P = 0.05$.

[z] Number of inoculated blueberry branches from which the test fungus was reisolated. Twelve branches inoculated in each treatment.

producing beta spores which were hyaline, filiform, curved, (11.0-)12.1-25.6 x 0.9-2.2 µm.

Comments: Isolates BB751 and CB produced alpha and beta spores on PDA, but BB1 and BB5 did not. When cultured on PDYA, BB1 and BB5 produced both alpha and beta spores, while BB751 and CB produced alpha and beta spores in small numbers (Chao, 1984) (see Table 3). As discussed elsewhere herein, nutritional factors have been shown previously to influence the kinds of spores produced by Phomopsis species.

Phomopsis isolates: Colonies (Fig. 1) when one-wk-old white to yellowish, often light tan in center, felty, with smooth margin; reverse coloration pale yellow. Covering plates in 8 da, usually producing conidia in 21 da; DB-P3 not sporulating. Conididiomata pycnidial, stromatic, black, 1-3 mm diam, forming near centers or throughout colonies. Conidiogenous cells phialidic, cylindrical, tapering, arising from pseudoparenchyma, 6.4-16.5(-18.2) x 1.3-3.3 µm. Conidia: alpha spores hyaline, unicellular, fusiform, biguttulate, 5.1-9.0 x

Table 2
Pathogenicity of *Diaporthe vaccinii* isolates BB1 and BB5 and *Phomopsis* sp. isolates P1, P2, and DB-P3 on Williams 79 and Wells II soybean.

Treatment	Mean lengths internal discoloration (mm)[y]			
	Test I		Test II	
	Williams 79	Wells II	Williams 79	Wells II
Control	1 a[y] (0)[z]	1 a[y] (0)[z]	1 a[y] (0)[z]	1 a[y] (0)[z]
P1	87 b (5)	110 b (5)	3 a (1)	89 b (5)
P2	24 a (3)	73 b (5)	48 b (4)	157 c (5)
DB-P3	4 a (2)	109 b (1)	18 a (3)	66 b (5)
BB1	1 a (0)	1 a (1)	1 a (0)	2 a (0)
BB5	2 a (0)	2 a (0)	1 a (0)	3 a (0)
LSD		37.1		27.7

[y] Means with the same letter are not significantly different according to FLSD test at *P* = 0.05.

[z] Number of inoculated soybean plants from which the test fungus was reisolated. Five plants inoculated in each treatment.

Table 3
Production of conidia by isolates of *Diaporthe vaccinii* isolates BB1, BB5, BB751, and CB on PDA and PDYA.

Isolate	PDA	PDYA
BB1	alpha	alpha and beta
BB5	alpha	alpha and beta
BB751	alpha and beta	alpha and beta[a]
CB	alpha and beta	alpha and beta[a]

[a] Few conidia produced.

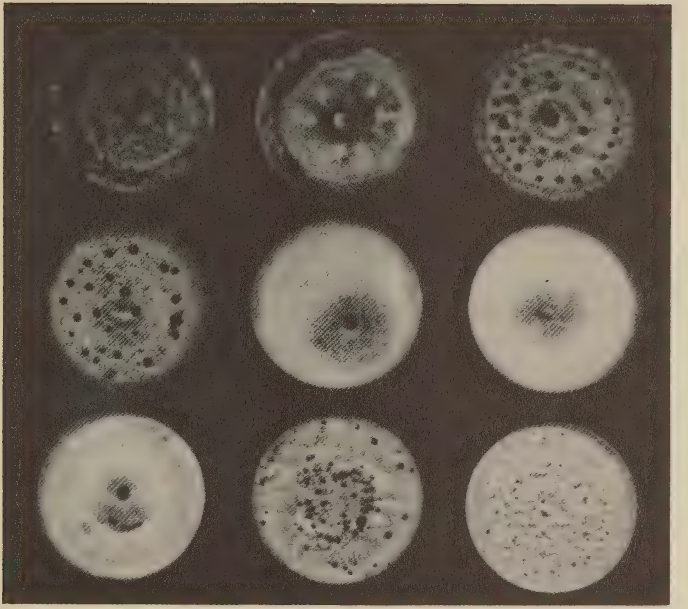

Fig 1. Month-old colonies of Diaporthe vaccinii, Phomopsis sp., and D. phaseolorum on PDA. Top row left: BB1, center: BB5, right: BB751; second row left: CB, center: P1, right: P2; bottom row left: DB-P3, center: DPS, right: DPC.

(1.3-)1.4-2.8 μm; beta spores hyaline, unicellular, filiform, curved, 12.8-25.6 x 0.9-1.3 μm.

Comments: Isolate DB-P3 did not sporulate on PDA, but did fruit on PDYA (Chao, 1984), allowing its identification as a member of the Phomopsis species complex on soybean (Kmetz and Schmitthenner, 1980).

Diaporthe phaseolorum var. sojae: Colonies (Fig. 1) when one-wk-old creamy white, felty, with smooth margin, reverse coloration light yellow. Covering plate in 6 da, producing conidia in about 10 da. Month-old colonies dark, reverse dark brown. Conidiomata pycnidial, stromatic, black, 0.3-0.7 mm diam, forming throughout plates. Conidiogenous cells phialidic, hyaline, cylindrical, tapering 7.7-9.0 x (1.3-)1.5-2.6 µm. Conidia: alpha spores, hyaline, unicellular, fusiform, biguttulate, (5.1-)5.8-12.2 x 2.3-3.0 µm; beta spores hyaline, filiform, curved, (11.5-)14.1-20.5 x 1.3-2.0(-2.6) µm. Ascomata scattered. Asci with 8 spores biseriately arranged, clavate, sessile, hyaline, (30.7-)33.3-39.7 (-44.8) x 7.7-9.0(-10.3) µm, unitunicate. Ascospores hyaline, ellipsoidal, uniseptate, constricted at septum, guttulate, 11.3-12.1(-12.8) x (2.6-)3.2-4.5(-6.4) µm.

Diaporthe phaseolorum var. caulivora: Colonies (Fig. 1) when one-wk-old white, felty, with smooth margin, reverse coloration light yellow. Covering plate in 6 da, producing conidia in about 15 da. Month-old colonies white, with little aerial mycelium, reverse coloration yellow. Conidiomata pycnidial, stromatic, black, 0.5-1 mm diam, forming throughout plate. Conidiogenous cells phialidic, hyaline, cylindrical, tapering, arising from pseudoparenchyma, (9.0-)10.2-12.2(-15.4) x (1.3-) 1.9-3.2(-3.8) µm. Conidia: alpha spores hyaline, unicellular, fusiform, biguttulate, 3.8-6.4(-7.0) x 1.3-2.6(-3.2) µm. Ascomata scattered. Asci with 8 spores biseriately arranged, clavate, sessile, hyaline, (20.5-) 23.0-29.4(-38.4) x (3.8-)5.1-6.4(-11.5) µm. Ascospores hyaline, ellipsoidal, uniseptate, constricted at septum, guttulate, (5.1-)7.7-9.0(-10.3) x 2.3-2.6(-3.8) µm.

DISCUSSION

Pathogenicity of D. vaccinii was evaluated on blueberries and soybeans and compared with pathogenicity of Phomopsis isolates from soybean. Diaporthe vaccinii isolates were pathogenic on blueberry but not soybean, while soybean Phomopsis isolates were pathogenic on soybean but not blueberry. These results suggest that D. vaccinii is at least somewhat host specific and is not likely to occur naturally on soybeans. Kulik (1984) suggested that pathogenicity tests of Phomopsis species on soybean should be conducted by inoculating unwounded plants, since wounds might overcome natural resistance. While this might indeed occur in some fungus-host combinations, our results indicate that such is not the case with the soybean cultivars and fungi used in this study. Wells II is generally considered susceptible to Phomopsis-caused diseases, while Williams 79 is considered to have moderate resistance (Hymowitz *et al*., 1976). In our tests using Williams 79, *Phomopsis* isolates usually did not cause lesions differing from control treatments, while they always did on Wells II. In addition, *Phomopsis* isolates produced longer lesions on Wells II than Williams 79. Therefore, it appears that the inoculation technique used in this study, which involved wounding the host, did not mask host resistance.

Diaporthe vaccinii and *D. phaseolorum* differed in cultural characteristics, including size, number, and types of sporocarps; amounts of alpha and beta conidia produced; and coloration. Generally, *D. vaccinii* produced more and larger pycnidia, formed more conidia, and more frequently produced both types of conidia than did soybean isolates. Only the *D. phaseolorum* isolates produced sexual states.

Diaporthe vaccinii isolates BB1 and BB5 differed somewhat from BB751 and CB in cultural characteristics. BB1 and BB5 tended to form smaller pycnidia, and produced beta spores on PDYA but not on PDA, while BB751 and CB had larger pycnidia and produced more beta conidia on PDA than on PDYA. Further studies employing greater numbers of isolates would be helpful in evaluating the variability of these characters in *D. vaccinii*.

Isolates BB751 and CB produced more of both alpha and beta conidia on PDA than on PDYA, while BB1 and BB5 produced only alpha conidia on PDA and both kinds of conidia on PDYA. *Phomopsis* isolates produced mostly alpha conidia with low numbers of beta conidia on all media. Isolates DPS and DPC produced more beta conidia than alpha conidia on PDA. The ratios of alpha to beta conidia of some *Diaporthe* and *Phomopsis* species were shown previously to be influenced by nutritional factors (Nitimargi, 1935; Pine, 1958; Pezet, 1974). The results of the present study agree with those of earlier researchers, and suggest that when attempting to identify suspected isolates of *D. vaccinii* in culture, both PDA and PDYA should be used.

In summary, *D. vaccinii* isolates were pathogenic on blueberry but not soybean, and could be differentiated from *D. phaseolorum* varieties *caulivora* and *sojae* in culture on the basis of culture morphology and failure to produce the sexual state. These differences in morphology and host specificity appear to justify continued recognition of *D. vaccinii* as a species distinct from *D. phaseolorum*.

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NEW TAXA OF HYGROPHORUS FROM CALIFORNIA.

DAVID L. LARGENT

Department of Biological Sciences, Humboldt State
University, Arcata, California, 95521.

SUMMARY

Twelve new species and two new varieties of *Hygrophorus* subgenus *Hygrophorus* sensu Hesler and Smith (1963) (Hygrophoraceae, Agaricales) are described from California. In section *Camarophyllopsis* Hesler and Smith, *H. subbasidiosus* is described as new. In section *Hygrocybe* Fr., *H. albinellus*, *H. mamillatus*, *H. subaustraligus*, and *H.subcitrinopallidus* are described as new; In section *Hygrophorus*, new species are *H. brunneus*, *H. perfumus*, *H.pseudotephroleucus*, *H. pyrophilus*, *H. sitchensis*, *H. subellenae*, and *H. subfusoideus*, and new varieties are *H. discoideus* (Fr.)Fr. var. *californicus*, and *H. nemoreus* (Lasch.)Fr. var. *raphaneus*.

INTRODUCTION

In California, the genus *Hygrophorus* sensu lato is well represented with at least 135 taxa being described (Largent, 1985). Of these fourteen have been found to be new to science.

The large number of new taxa is not surprising since only four extensive taxonomic works have been published for all of North America (Murrill, 1916; Peck, 1907; Hesler and Smith, 1963; Bird and Grund, 1979).

All of the taxa discussed are classified in *Hygrophorus* subgenus *Hygrophorus* sensu Hesler and Smith (1963) and are arranged according to the section.

Names of color in quotations are from Ridgway (1912). Colors from Kornerup and Wanscher (1961) are quoted by page (first number), horizontal column (letter) and vertical column (last number).

SECTION CAMAROPHYLLOPSIS Hesler and Smith

Hygrophorus subbasidiosus Largent, sp. nov.

Pileus usque ad 60 mm latus, convexus, siccus, innato-fibrillosus, griseo-brunneus. Sapor nullus. Odor ingratus. Lamellae decurrentes, albae. Stipes usque ad 75 mm longus, usque ad 10.0 mm latus, albus dein fuscans, modice fibrillosus. Sporae 5.2-9.1 x 5.2--8.2 µm, subglobosae, rare ellipsoideae. Basidia 38.7--45.7 x 7.1-8.1 µm, 4-spora. Pleurocystidia et cheilocystidia abundantia, versiformia, 35.6-55.8 x 4.2--6.2 µm. Lamellarum trama intertexta. Pileipellis cutiformis. Basidiorum et cystididorum basis atque hyphae pileipellis fibulis praeditae. Basidiocarpi gregarii ad terram inter gramina. Holotypus (UC605287) in UCB conservatus.

Pileus up to 60 mm broad, convex; margin incurved; surface innately fibrillose, greyish brown; context white, thin on the margin; taste none; odor disagreeable. Lamellae decurrent, subdistant, moderately broad (about 5 mm), white when fresh. Stipe up to 75 mm long, up to 10 mm wide at apex, almost equal, solid; surface somewhat fibrillose, white and darkening with age.

Spores 5.5-10.0 x 5.5-8.3 µm, $\underline{x}$L 7.0 µm, $\underline{x}$W 6.7 µm, L--D 0.0-2.0 µm, Q 1.0-1.3, subglobose to rarely ellipsoid, inamyloid. Basidia 38.7-49.7 x 7.7-8.8 µm, L/W 6.6-8.3, 4--spored; sterigmata up to 6.0 µmlong. Pleurocystidia and cheilocystidia abundant, versiform, with many tips irregularly branched, 38.7 x 60.8 x 4.4-6.6 µm. Lamellar trama slightly to intricately interwoven, appearing somewhat parallel to subparallel towards gill-edge. Pileus cuticle with scattered wefts of hyphae on the surface, more or less an entangled cutis; hyphae not gelatinized. Stipe cuticle at the stipe apex a narrow and indistinct cutis; wefts of hyphae absent. Clamp connections present (pileus cuticle, basidia, cysitidia).

Material studied, Habit and Habitat: CALIFORNIA. Contra Costa county: UC 605287 (HOLOTYPE; UC); gregarious on soil in a much shaded lawn, north of the Life Sciences Building, University of California, Berkeley, campus; 6 January 1939. (legit: Vera Miller).

Hygrophorus subbasidiosus is distinguished by the clitocyboid grey-brown, dry pileus, white lamellae, white stipe and globose to subglobose spores. Pleurocystidia and cheilocystidia may be present but the similarity in size to the basidia and the irregular tips indicate that these structures may be nothing more than aborted basidia.

This fungus was identified as nearest to *Hygrophorus albipes* Pk. by Vera Miller who collected it and also wrote the description of the macroscopic features. However *H. albipes* can be distinguished from *H. subbasidiosus* by the omphalinoid stature and spores, 4.5-5.5 µm long. *H. umbrinus* Dennis and *H. basidiosus* (Pk.) Pk. are also similar in carpophore stature and color as *H. subbasidiosus*. *H. umbrinus* has larger basidia (46-62 x 5-7 µm) and smaller spores (4.5-5.5 µm) whereas *H. basidiosus* has smaller spores (4-6 x 3-4.5 µm) and gray lamellae.

SECTION HYGROCYBE Fries.

Hygrophorus albinellus Largent, sp. nov.

Pileus 40-70 mm latus, primo conicus, dein cuspidatus, albus, viscidus. Odor et sapor non distincti. Lamellae adnato-ascendentes vel sinuatae, albae. Stipes 100-160 mm longus, 10-15 mm latus, siccus, glaber, albus. Sporae 10.2-14.2 x 7.1-9.1 µm, xL 12.3 µm, xW 7.6 µm, L-D 3.5-6.0 µm, Q 1.37-1.86, ex elliptica peranguste ellipticae. Basidia 38.6-57.9 x 12.2-17.2 µm, L/W 3.2-3.92, 4-spora. Cheilocystidia et pleurocystidia absentia. Lamellarum trama parallela, cellulis usque ad 24.6 µm. Pileipellis ixotrichodermiformis, cellulis terminalibus cylindricis, 49.3-98.5 x 2.5-6.0 µm. Stipitipellis cutiformis, cellulis terminalibus cylindricis, 49.3-73.8 x 2.5-4.9 µm. Fibulae basi basidiorum, in hyphis pileipellis, et stipitipellis adsunt. Basidiocarpi gregarii ad terram sub silva frondosa. Holotypus (HDT 27077) in SFSU conservatus.

Pileus 40-70 mm broad, conic when young, typically becoming cuspidate at maturity; margin even then eroded, often flared, undulating and then uneven; surface glabrous, smooth, very viscid, white except tinged gray in one; context 2-4 mm thick, white, translucent; taste and odor indistinctive. Lamellae ascending adnate to notched, subdistant, broad to somewhat ventricose, white; margin entire to eroded, concolorous. Stipe 100-160 mm long, 10-15 mm broad at apex, more or less equal to tapered to clavate; surface dry, glabrous, white; context stuffed, unchanging.

Spores 10.2-14.2 x 7.1-9.1 µm, xL 12.3 µm, xW 7.6 µm, L-D 3.5-6.0 µm, Q 1.37-1.86, elliptical to narrowly elliptical, inamyloid. Basidia 38.6-57.9 x 12.2-17.2 µm, L/W 3.2-3.92, 4-spored; sterigmata 5.1-6.1 x 1.0-3.1 µm, usually quite wide. Lamellar trama parallel; hyphae up to 24.6 µm. Pileus cuticle an ixotrichodermium; terminal cells cylindric, 49.3-98.5 x 2.5-6.0 µm. Stipe cuticle a cutis, composed of loosely entangled hyphae; terminal cells cylindric, 49.3-73.8 x 2.5-4.9 µm. Lactifers present in the pileus trama, long and sinuous. Clamp connections present (stipe cuticle, pileus cuticle, basidia).

Material Studied, Habit, and Habitat: CALIFORNIA. Santa Cruz County: HDT 27077 (HOLOTYPE: SFSU); Gregarious in soil in hardwoods, Boulder Creek, Santa Cruz county; 30 December 1970.

Hygrophorus albinellus is characterized by the pure white colors, conic to cuspidate, viscid pileus, white, dry stipe, large spores and lack of cystidia. *H. calptraeformis* Berk. & Br. apud Berk. var. *calptraeformis*, although similar in shape to *H. albinellus*, differs because of the pinkish colors and cysitida. *H. purus* Pk. has a white carpophore as *H. albinellus* but is distinct because of the viscid stipe and smaller spores.

The size of the spores and carpophore of *H. albinellus* is similar to that of the *H. conicus*-*H. nigrescens* and *H. acutoconicus* species complexes, all of which can be differeniated by the brightly colored carpophore.

Hygrophorus mamillatus Largent. sp. nov.

> Pileus 12-25 mm latus, 5-6 mm altus, primo convexus dein plano-convexus vel planus, typice acutato-umbonatus, viscidus, glaber, flavidus vel flavido-aurantiacus; margine vulgo crenulato. Odor et sapor non distincti. Lamellae adnatae, flavidae. Stipes 53-115 mm longus, 2-4 mm latus ad apicem, 1.25-2.50 mm latus ad basim, vulgo flexuosus, glutinosus, flavidus vel flavido-aurantiacus. Sporae 6.1-8.1 x 4.1-5.1 μm, x̄L 7.25 μm, x̄W 4.7 μm, L-D 1.0-4.0 μm, Q 1.2-2.0, ellipticae. Basidia 40.5-48.8 x 6.1-7.1 μm, L/W 5.71-8.0, 4-spora. Cheilocystidia et pleurocystidia absentia. Lamellarum trama parallela, cellulis 2.46-12.3 μm latis. Pileipelli ixocutiformis, cellulis terminalibus cylindricis, 61.6-123.2 x 1.85-3.08 μm. Stipitipellis ixotrichodermiformis, cellulis terminalibus cylindricis, apice vulgo crispato. Fibulae frequentes. Basidiocarpi dispersi ad terram sub Polysticho munito et *Sequoia* semipervirente. Holotypus (DLL 8565) in HSU conservatus.

Pileus 12-25 mm broad, 5-6 mm high, convex then plano-convex to plane, consistently acutely umbonate; margin decurved then upturned, faintly translucent-striate, usually somewhat crenulate; surface glabrous, viscid, not hygrophanous, orange on the umbo, yellowish (5,A,6) to yellowish orange (7,A-B,8) elsewhere; context concolorous with the pileus, watery, 1-2 mm thick near the umbo; taste and odor indistinctive. Lamellae adnate, subdistant to distant, moderately broad (3-5 x 5-12 mm), yellowish (4,A,2), lighter toward the pileus; margin even then eroded, concolorous. Stipe 53-115 mm long, 2-4 mm broad at apex, 1.25-2.50 mm broad at base, tapered, flexuous, terete; surface glabrous, glutinous, shiny, yellowish to yellowish orange (4-5,A,5), more or less whitish at base; context concolorous with the surface; basal mycelium absent.

Spores 6.1-8.1 x 4.1-5.1 μm, x̄L 7.25 μm, x̄W 4.7 μm, L-D 1.0-4.0 μm, Q 1.2-2.0, elliptical, inamyloid. Basidia 40.5-48.8 x 6.1-7.1 μm, L/W 5.71-8.0, 4-spored; sterigmata long and thick, 2.0-10.2 x 1.5-2.5 μm. Lamellar trama parallel, hyphae 2.46-12.3 μm broad. Pileus trama distinct from the cuticle; hyphae parallel in radial section, 7.4-22.2 μm broad. Pileus cuticle an ixocutis; terminal cells 61.6-123.2 x 1.85-3.08 μm. Stipe cuticle an ixotrichodermium; terminal cells cylindric, frequently curled at apex, 61.6-246 x 1.3-2.46 μm. Lactifers absent (stipe and pileus trama). Clamp connections present (pileus cuticle, stipe cuticle, stipe trama).

Material Studied, Habit, and Habitat: CALIFORNIA. Del Norte County: DLL 8565 (HOLOTYPE: HSU; Scattered in redwood branchlet humus beneath Sword fern (*Polystichum munitum* (Kaulf.) Presl.) and near coast redwood

(Sequoia sempervirens (D. Don) Endl.); from Prairie Creek Trail across from Big Tree, Prarie Creek State Park; 18 November 1983.

Hygrophorus mamillatus can be recognized by the long, glutinous, yellowish stipe, adnate, yellowish lamellae, viscid, acutely umbonate, orangish to yellowish orange pileus, elliptical spores and short basidia.

Hygrophorus glutinipes (Lge.) Orton, although similar in color as H. mamillatus, differs by the more narrow spores (3-4.5 µm broad), finely adnexed lamellae, habitat beneath hardwoods, and pileus that is not acutely umbonate.

Several species in the Hygrophoraceae have an umbonate pileus as does H. mamillatus. Hygrophorus luteistipes Dennis can be recognized by the scarlet to orange, obtusely umbonate pileus and adnexed lamellae. H. ruber Pk. differs by the bright red pileus, adnexed lamellae, short, bright red stipe, and somewhat broader spores (4.5-6.0 µm). Hygrocybe subpapillata Kühner can be differentiated by the dry, bright red at first stipe, longer and broader spores (7.7-10 x 4.5-6.5 µm). H. mucronella (Fr.) Karst. is distinct by virtue of the scarlet to smaller red pileus and the slightly bitter taste.

Hygrophorus subaustraligus Largent. sp. nov.

Pileus 25-50 mm latus, convexus vel plano-convexus vel planus, viscidus ubi humidus, subviscidus ubi siccus, glaber, albus, saepe disco flavidus. Odor non distinctus. Sapor non distinctus vel leviter amarus. Lamellae emarginatae vel adnexae, albae. Stipes 20-75 mm longus, 4-17 mm latus ad apicem, 6-10 mm latus ad basim, siccus, apice pruinoso vel glabro, aliter striatus, albus, vulgo brunneus ad basim. Sporae 5.1-7.6 x 3.1-5.1 µm, xL 6.15 µm, xW 4.0 µm, L-D 1.0-4.0 µm, Q 1.20-2.30, subglobosae vel late ellipticae. Basidia 40.6-50.8 x 6.1-7.1 µm, L/W 5.71-8.33, 4-spora. Pleurocystidia et cheilocystidia absentia.. Lamellarum trama parallela; hyphis 29.5-98.5 x 4.9-14.8 µm latis. Pileipellis ixocutiform- is, 100-400 µm crassa; cellulis terminalibus cylin- dricis, 24.6-98.5 x 1.85-3.7 µm Stipitipellis cuti- formis, cellulis terminalibus cylindricis. Fibulae basi basidiorum et in hyphis pileipellis adsunt. Basidiocarpi dispersi in sylvis, Sequoia sempervirente dominante, dispersi. Holotypus (Arora, 26 January 1984) in HSU conservatus.

Pileus 25-50 mm broad, convex to plano-convex to plane; margin upturned, faintly translucent-striate; surface moist to lubricous to subviscid, glabrous, shiny, not hygrophanous, white and often tinged yellowish to very "pale buff", especially at the center; context white, 3-5 mm thick on the disc; taste indistinctive to slightly bitter, difficult to detect; odor indistinctive. Lamellae emarginate to adnexed, close to subdistant, moderately broad (5-7 x 11-20 mm), surface white; margin even and concolorous. Stipe 20-75 mm long, 4-17 mm broad at apex, 6-10 mm broad at base, variable in shape, equal to clavate; surface dry, longitudinally striate, at times pruinose at apex, without a veil; white, often discoloring brownish at base; context with a tough outer rind, hollow with age; basal mycelium absent.

Spores 5.1-7.6 x 3.1-5.1 µm, xL 6.15 µm, xW 4.0 µm, L-D 1.0-4.0 µm, Q 1.20-2.30, subglobose to broadly elliptical, inamyloid. Basidia 40.6-50.8 x 6.1-7.1 µm, L/W 5.71-8.33, 4-spored; sterigmata 2.1-7.1 x .76-1.01 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama parallel to slightly interwoven; hyphae 29.5-98.5 x 4.9 -14.8 µm. Pileus cuticle an ixocutis, 100-400 µm thick; terminal cells cylindric, 24.6-98.5 x 1.85-3.7 µm Stipe cuticle a cutis; terminal cells rare and similar to the pileus cuticle. Lactifers absent. Clamp connections present (pileus cuticle, basidia).

Habit and Habitat: Uncommon; Solitary to scattered in humus of woods with coast redwood predominant or in branchlet humus beneath coast redwood; thus far reported from Santa Cruz county northward to Prairie Creek State Park in Del Norte county; November to January.

Material Studied: CALIFORNIA. Del Norte County: DLL 8612, 8635; Santa Cruz County: Arora, 26 January 1984 (HOLOTYPE: HSU; widely scattered in mixed woods with coast redwood (*Sequoia sempervirens*) dominant); San Mateo County: HDT 45804.

Hygrophorus subaustraligus can be recognized by the whitish, lubricous to subviscid pileus with a yellowish disc, adnexed, white lamellae, fairly broad, white stipe, subglobose to broadly elliptical spores, and slightly bitter taste.

Hygrophorus subaustralis Sm. & Hes. and *H. brevipes* Sm. & Hes. are similar in stature and color as *H. subaustraligus*. *H. subaustralis* can be differentiated by the cheilocystidia, pleurocystidia and much smaller basidia (24-30 x 5-6 µm); in fact the basidia size makes *H. subaustralis* a questionable species of *Hygrophorus*. *Hygrophorus brevipes* is distinct because of the adnate to subdecurrent, close to narrow lamellae, shorter stipe (15-20 mm long) and longer spores (7-12 µm).

Hygrophorus subcitrinopallidus Largent. sp. nov.

Pileus 10-17 mm latus, plano-convexus vel planus, subviscidus, glaber, hygrophanus, vivide flavus. Odor et sapor non distinctus. Lamellae decurrentes, flavae. Stipes 20-22 mm longus, 2.5-3.0 mm latus, glaber, lubricus vel subviscidus, pileo concolor. Sporae 8.1-10.2 x 3.0-4.5 µm, xL 8.4 µm, xW 3.45 µm, L-D 3-5.5 µm, Q 2.0--2.67, peranguste fusoideae vel cylindricae. Basidia 32.5-45.7 x 5.1-7.1 µm, L/W 4.5-7.0, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama parallela vel subparallela, hyphis saepe clavatis vel subovoidies. Pileipellis ixotrichodermiformis non distincta, 123.2-197 µm crassa; cellulis terminalibus cylindricis, 22.2-81.2 x 1.2-4.9 µm. Stipitipellis cutiformis. Hyphae tramae stipitis clavatae, 14.8-29.5 µm latae. Fibulae nullae. Basidiocarpi dispersi in terra fusca sub Juncis, Polysticho et *Woodwardia*, prope *Sequoia* sempervirente. Holotypus (DLL 8504) in HSU conservatus.

Pileus 10-17 mm broad, plano-convex to plane, translucent striate to the disc; margin decurved, undulate; surface subviscid, glabrous, hygrophanous, bright yellow (3,A,4-5) and fading to a dull medium yellow (3,A,5-6); context yellow, thin, up to 1.0 mm thick on the disc; taste and odor indistinctive. Lamellae long decurrent, subdistant to distant, narrow to moderately broad (1.5-2.5 x 5-7 mm), yellow (3,A,2-3); margin smooth and concolorous. Stipe 20-22 mm long, 2.5-3.0 mm broad at apex, 2.0-2.5 mm broad at base, tapered, terete; surface glabrous, subviscid to lubricous, concolorous with the pileus; basal mycelium absent.

Spores 8.1-10.2 x 3.0-4.5 µm, $\underline{x}$L 8.4 µm, $\underline{x}$W 3.4 µm, L-D 3-5.5 µm, Q 2.0-2.67, narrowly fusoid to cylindric, inamyloid. Basidia 32.5-45.7 x 5.1-7.1 µm, L/W 4.5-7.0, 4-spored; sterigmata 5.1 x 1.0 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama parallel to subparallel; hyphae often clavate to almost ovoid, up to 14.8 µm broad. Pileus trama composed of entangled, clavate to ovoid cells. Pileus cuticle a poorly developed ixotrichodermium; hyphae somewhat gelatinized, 123.2-197 µm thick; terminal cells cylindric, 22.2-81.2 x 1.2-4.9 µm. Stipe cuticle a cutis; terminal cells similar to the pileus. Stipe trama composed of broad hyphae, up to 29.5 µm broad. Lactifers present in the lamellar trama, absent in the stipe and pileus trama. Clamp connections absent (all parts).

Material Studied, Habit, and Habitat: CALIFORNIA. Humboldt County: DLL 8504 (HOLOTYPE: HSU); Rare; Scattered in dark humus beneath sedges (*Juncus*) and ferns (*Polystichum*, *Woodwardia*) near but not beneath coast redwood; on the edge of Fern Lake, Humboldt State University campus; 24 October 1984.

Hygrophorus subcitrinopallidus is characterized by the bright yellow colors, viscid, translucent-striate pileus, decurrent lamellae, lubricous to subviscid stipe, small basidia, broad tramal hyphae, narrowly fusoid to cylindric spores.

At least four other species of *Hygrophorus* are similar in color, stature and possess similar cells in the pileus and lamellar trama as *Hygrophorus subcitrinopallidus*. *Hygrophorus citrinopallidus* Sm. & Hes. is distinct by the slightly broader spores ($\underline{x}$W 4.4 µm), viscid stipe, and smaller basidia. *Hygrophorus vitellinus* Fr. sensu Bon (1976) and Arnolds (personal communication) can be recognized by the shorter (5-8 µm long), more elliptical spores, viscid and larger stipe

(50-70 x 4-8 mm). Hygrocybe subvitellina Bon is distinct because of the strangulated spores, larger and broader stipe (15-70 x 2-5 mm) and subdecurrent lamellae. Hygrophorus subminiatus (Murr.) Murr. is quite similar to H. subcitrinopallidus but has slightly less broad, constricted spores (7-9 x 3.5-5 µm), 2-spored basidia, and is bright red in color.

SECTION HYGROPHORUS Fries

Hygrophorus brunneus Largent, sp. nov.

> Pileus 35-75 mm latus, primo convexus vel late convexus, dein plano-convexus aut immutatus, saepe late umbonatus, glaber, glutinosus vel viscidus, primo fuscus vel modice flavobrunneus, dein modice flavobrunneus; margine primo incurvatus, gossypinus vel fibrillosus aut tomentosus, dein decurvatus, subglaber. Odor et sapor non distincti. Lamellae adnatae vel decurrentes, candidae. Stipes 50-115 mm longus, 10-20 mm latus, aequalis, siccus, apice pruinosus vel scabrosulus, ad medium pruinosus vel scabrulosus aut glaber, aliter glaber, albus. Sporae 6.1-10.2 x 4.1-6.1 µm, xL 8.1 µm, xW 4.73, L-D 2.0-5.0 µm, Q1.4-2.25, ellipticae. Basidia 40.6-60.9 x 5.1-8.1 µm, L/W 6.25-8.57, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens, hyphis 4.9-19.7 µm. Pileipellis ixotrichodermiformis, 100-300 µm crassa; cellulis terminalibus cylindricis 24.6-86.2 x 2.4-4.9 µm. Stipitipellis constans ex fasciculis abundantibus hypharum aggluntinatarum, cellulis terminalibus cylindricis 29.5-86.2 x 2.4-4.9 µm. Fibulae frequentes. Basidiocarpi dispersi in humo sub Vaccinio, Quercum et Pseudotsuga. Holotypus (DLL 8623) in HSU conservatus.

Pileus 35-75 mm broad, convex to broadly convex becoming plano-convex or unchanging, often broadly and obtusely umbonate; margin at first inrolled to incurved, even, and cottony to fibrillose or tomentose, then incurved to decurved, eroded, and glabrous, opaque; at first dark yellow brown ("Mikado brown" to "verona brown" to "warm sepia" to "cinnamon brown" to "Prout's brown"; 6,E-F,7) to moderately yellow brown fading toward the margin to medium yellow brown ("sayal brown" to "cinnamon" to "mikado brown" to "ochraceous tawny" to "buckthorn brown"; 6,B-D,7), on the margin whitish to yellowish white to orangish white to even orange-yellow ("warm buff" to "light buff" to "pale ocharaceous buff"; 5,A,2); context white to whitish, beneath the cuticle nearly concolorous with the surface, 5-9 mm thick near the disc; taste and odor indistinctive. Lamellae adnate to decurrent, close to subdistant to distant, moderately broad to broad (5-10 x 15-27 mm) snow white; margin even, obtuse and concolorus. Stipe 50-115 mm long, 10-20 mm broad, equal to clavate, in some even narrowed at base; surface dry, pruinose to minutely scabrulose at apex and in some halfway down the stipe, glabrous elsewhere, white and becoming faintly brunnescent on handling; basal mycelium abundant and strongly hirsute.

Spores 6.1-10.2 x 4.1-6.1 µm, xL 8.1 µm, xW 4.73, L-D 2.0-5.0 µm, Q1.4-2.25, elliptical, inamyloid. Basidia 40.6-60.9 x 5.1-8.1 µm, L/W 6.25-8.57, 4-spored; sterigmata 7.1-9.2 x 1.1-1.6 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent; hyphae 4.9-19.7 µm. Pileus cuticle an ixotrichodermium, 100-300 µm thick; terminal cells cylindric, 24.6-86.2 x 2.4-4.9 µm. Stipe cuticle at apex composed of abundant clusters of agglutinated, non-gelatinized hyphae; terminal cells cylindric, 29.5-86.2 x 2.4-4.9 µm. Lactifers absent. Clamp connections present (all parts).

Habit and Habitat: Fairly common; Scattered in humus of mixed woods, beneath or near *Vaccinium*, *Quercus*, or *Pseudotsuga*, coastal California, San Mateo county northward to Trinty county; November to December.

Material Studied: CALIFORNIA. Mendocino County: HDT 10670; San Mateo County: HDT 24677; Trinity County: DLL 8623 (HOLOTYPE: HSU; Scattered in moss covered humus beneath *Vaccinium* and young Douglas fir (*Pseudotsuga*) and near oaks (*Quercus*), on south side of State Highway 299 across from Gray's Falls Campground; 8 December 1983).

Hygrophorus brunneus is characterized by the dark to light yellow brown, glutinous pileus with a cottony to tomentose margin, adnate to decurrent, subdistant, white lamellae, and whitish stipe with a pruinose to minutely scabrulose apex, and elliptical spores.

Hygrophorus roseibrunneus Murr. is very similar to *H. brunneus* in stature, pileus margin and pruinose stipe-apex but differs by the more pinkish to reddish brown pileus, pale yellowish lamellae, more densely pruinose to punctate stipe-apex, and yellow stipe-base.

Hygrophorus discoideus (Fr.)Fr. var. *californicus* Largent. var. nov.

Pileus 15-50 mm latus, primo convexus vel plano-convexus, dein plano-convexus vel turbinatus vel planus, glaber, glutinosus vel viscidus, primo modice rubro-brunneus disco, margine aurantiacus vel aurantiaco-flavus vel flavidus, aliter rubro-brunneus, dein omnino dilute flavido-brunneus. Odor et sapor non distincti. Lamellae subdecurrentes vel decurrentes, primo pallide flavidae vel flavidae, dein flavido-albae. Stipes 30-50 mm longus, 4-10 mm latus ad apicem, aequalis, glaber, glutinosus, pallide flavidus vel cremeus, dein pallide aurantiacus. Sporae 7.1-10.2 x 4-6 µm, xL 9.1 µm, xW 5.3 µm, L-D 2.5-5.0 µm, Q 1.5-2.0, ellipticae. Basidia 40.6-60.9 x 6.1-8.1 µm, L/W 5-10, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens. Pileipellis ixotrichodermiformis, 100-350 µm crassa; cellulis terminalibus cylindricis. Stipitipellis ixocutiformis, cellulis terminalibus cylindricis. Fibulae frequentes. Basidiocarpi dispersi vel gregarii in humo sub Abiete et Picea engelmanii, vulgo 1675 et 1980m. Holotypus (DLL 8432) in HSU conservatus.

Pileus 15-50 mm broad, convex to plano-convex, then plano-convex to turbinate to plane; margin undulate, decurved to uplifted, opaque; surface glabrous, shiny, glutinous to viscid, at times with dots or rings of darker colors, medium reddish brown (8-9,E-F,5-6) on the disc, less reddish brown (8-9,C-D,5-6) toward the margin, orangish to organish yellow to yellowish (5,A,3) at the margin, when faded light yellowish brown; context 3-5 mm thick near the disc, whitish to pale yellowish except concolorous with surface beneath the cuticle; taste and odor indistinct. Lamellae subdecurrent to decurrent, subdistant to distant, narrow then moderately broad to broad (3-6 x 7-25 mm), yellowish to pale yellowish (5,A,3) then yellowish white (5,A,1-2); margin smooth, concolorous. Stipe 30-50 mm long, 4-10 mm broad at apex, equal, terete; surface glabrous, glutinous, veil present when young, with age the veil only visible with a hand lens, cream color to pale yellowish (5,A,1-2), darkening to light orange (5-6,B,4) with age and handling; context stuffed and concolorous with the pileus except hollow and brunnescent in stipe-base. Basal tomentum scarce to absent.

Spores 7.1-10.2 x 4-6 µm, $\underline{x}$L 9.1 µm, $\underline{x}$W 5.3 µm, L-D 2.5-5.0 µm, Q 1.5-2.0, elliptical, inamyloid. Basidia 40.6-60.9 x 6.1-8.1 µm, L/W 5-10, 4-spored, sterigmata up to 6.1 x 1.5 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent. Pileus cuticle an ixotrichodermium, up to 350 µm thick; terminal cells cylindric. Stipe cuticle an ixocutis; terminal cells similar to those of the pileus cuticle. Lactifers absent. Pigmentation incrusting the hyphal walls of the pileus cuticle. Clamp connections present (all parts).

Habit and Habitat: Somewhat uncommon; thus far collected most frequently under true firs or Engelmann Spruce from elevations over 5500 feet, in northern California; also reported under conifers in Jackson State Forest, Mendocino county; September to November.

Material studied: CALIFORNIA. Mendocino county: HDT 8368, 8425; Sierra county: HDT 30059; Trintity county: HDT 46760; DLL 8432 (HOLOTYPE: HSU; Scattered to gregarious in moss covered humus beneath Engelmann Spruce (Picea Engelmanii Parry ex Engelm.), along the banks of Duck Creek, Duck Lake trailhead, Klamath National Forest; 20 October 1983).

Hygrophorus discoideus var. californicus is distinguished by the reddish brown, viscid pileus with a darker disc when young, yellowish, decurrent lamellae, cream colored stipe with a well developed glutinous layer when fresh, and elliptical spores.

Hygrophorus discoideus (Fr.) Fr. var. discoid-

eus differs by the whitish lamellae with a pinkish tan tinge, slender stipe (3-5 mm broad), and smaller spores.

Hygrophorus variicolor Murr. is somewhat similar in color as *H. discoideus* but differs by the larger pileus (40-70 mm across), white, typically larger stipe (80-100 x 10-15 (or 3-5 mm) broad), reddish brown lamellae in herbarium specimens, and odor of almonds.

Hygrophorus nemoreus (Lasch)Fr. var. *raphaneus* Largent. var. nov.

Pileus 50-130 mm latus, late convexus vel fere planus, primo viscidus dein siccus, glaber vel fibrilloso-lineatus, interdum squamulosus, armeniaco-flavus vel aremeniaco-aurantiacus vel aurantiaco-flavus vel aurantiaco-cinnamomeus. Sapor mitis vel raphanoides. Odor ei Cucurbitarum similis. Lamellae adnatae vel decurrentes, confertae, albidae vel pallide aurantiaco--flavae. Stipes 40-100 mm longus, 20-35 mm latus, aequalis vel bulbosus, siccus, apice albus, furfuraceus, aliter albus vel pileo concolor, glaber. Sporae 5.1-7.1(-10.2) x 2.6-4.6 µm, xL 6.6 µm, xW 3.5 µm, L-D 2.0-5.5 µm, Q 1.6-2.2, peranguste ellipticae. Basidia 40.6-60.9 x 5.1-6.1 µm, L/W 7.0-11.0, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens, hyphis 36.3-172.4 x 4.9-19.7 µm. Pileipellis ixocutiformis, 24.6-300 µm crassa, cellulis terminalibus cylindricis, 24.6-98.5 x 1.23-2.46 µm. Stipitipellis ixocutiformis. Fibulae frequentes. Basidiocarpi solitarii ad terram prope Quercum agrifoliam et Quercum dumosam. Holotypus (Wright 1688) in HSU conservatus.

Pileus 50-130 mm broad, broadly convex to nearly plane; margin inrolled at first, in age more or less spreading and wavy; surface viscid at first, soon dry, glabrous to fibrillose-streaked, at times the cuticle broken into small scales; colored apricot-yellow to more or less apricot-orange to orange brown to orange cinnamon ("hazel" to "vinaceous cinnamon"); context white to tinged pale apricot, thick on the disc; taste mild to radish-like; odor more or less of cucumber. Lamellae adnate to decurrent, some forked, narrow, close, off-white to pale dull orange- yellow (more or less "vinaceous cinnamon") or tinged salmon; edges even and concolorous. Stipe 40-100 mm long, 20-35 mm broad at apex, equal or with a non-marginate bulb, at times tapered downward; surface dry, silky, upper portion white and scurfy to furfuraceous, basal 3/4 white and mixed with pale salmon to concolorous with the pileus; basal mycelium white, cottony, fairly abundant; veils none.

Spores 5.1-7.1(-10.2) x 2.6-4.6 µm, xL 6.6 µm, xW 3.5 µm, L-D 2.0-5.5 µm, Q 1.6-2.2, narrowly elliptical, inamyloid. Basidia 40.6-60.9 x 5.1-6.1 µm, L/W 7.0-11.0, 4--spored; sterigmata 3.1-5.1 x 1.1 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent, mediostratum 9.8-24.6 µm broad, lateral strata 22.2-86.2 µm broad, hyphae 36.3-172.4 x 4.9-19.7 µm. Pileus trama distinct from the cuticle; hyphae densely entangled, 4.9-24.6 µm broad. Pileus cuticle an ixocutis, 24.6-300 µm thick; terminal cells cylindric, 24.6-98.5 x 1.23-2.46 µm. Stipe cuticle a poorly developed ixocutis; hyphae slightly gelatinized; terminal cells 36.3-98.5 x 3.7-4.9 µm. Lactifers absent. Pigmentation typically vacuolar, at times faintly incrusted on the walls of some hyphae of the pileus cuticle. Clamp connections present (all parts).

Habit and Habitat: Uncommon; Gregarious in soil near *Quercus agrifolia* and *Q. dumosa*; Santa Cruz to El Cariso campground in Riverside county; December to January.

Material Studied: CALIFORNIA. Riverside County: Wright 1688 (HOLOTYPE: HSU; Solitary on dirt in duff under *Quercus agrifòlia* Neé and *Q. dumosa* Nutt., near El Cariso, Santa Ana mountains, elevation about 2000 feet; 27 December 1979), Wright 30 Dec 1978; Santa Cruz County: Arora, 26 January 1984.

Hygrophorus nemoreus var. *raphaneus* is distinguished by the clitocyboid to tricholomatoid stature, orange, viscid pileus, whitish to yellowish orange lamellae, orangish stipe-base, short, broad spores, cucumber odor and radish-like to mild taste.

Hygrophorus nemoreus (Lasch) Fr. var. *nemoreus* lacks a detectable taste and at most has a slightly fra- grant odor; otherwise it is identical with var. *rapha- neus*. *Hygrophorus penarius* Fr. differs by the more yellowish to pallid pileus, distinctive, meaty odor, and longer spores (6.1-8.1 µm long with *x*L of near 7.6 µm).

Hygrophorus perfumus Largent. sp. nov.

Pileus 80 mm latus, plano-convexus vel subdepressus, glaber, siccus, albus. Sapor non distinctus. Odor suavis. Lamellae decurrentes, angustes vel subdistantes, albae vel albidae. Stipes 40 mm longus, 20 mm latus, aequalis, glaber, siccus, albus. Sporae 8.1-11.2(-14) x 4.1-6.1 µm, *xL* 9.67 µm, *xW* 5.65 µm, L-D 2.5-5.5(-8.0) Q 1.38-2.10(-2.33), peranguste ellipticae. Basidia 50.8-78.2 x 9.1-11.2 µm, L/W 5.27-7.70, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens. Pileipellis cutiformis, 73.8 µm crassa, cellulis terminalibus cylindricis. Fibulae frequentes. Basidiocarpi solitarii vel dispersi ad terram in silvis coniferis. Holotypus (HDT 12786) in SFSU conservatus.

Pileus 80 mm broad, plano-convex to plane and shallowly depressed; margin incurved to decurved then slightly upturned, even to undulate-wavy, not translucent; surface glabrous, moist to dry, not hygrophanous, white and unchanging; context thick, up to 155 mm on the disc, white, unchanging; taste indistinctive; odor like perfume, pleasant, often hard to detect. Lamellae decurrent, close to subdistant, moderately broad, white to off-white; margin entire and concolorous. Stipe 40 mm long, 20 mm broad, equal, terete; surface glabrous, dry, white; context white, solid; basal mycelium absent.

Spores 8.1-11.2(-14) x 4.1-6.1 µm, $\underline{x}$L 9.67 µm, $\underline{x}$W 5.65 µm, L-D 2.5-5.5(-8.0) Q 1.38-2.10(2.33), narrowly elliptical, inamyloid. Basidia 50.8-78.2 x 9.1-11.2 µm, L/W 5.27-7.70, 4-spored; sterigmata 5.1-10.2 x 1.1-2.1 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent, mediostratum rather narrow, up to 40 µm wide. Pileus cuticle a cutis, 245 µm thick; terminal cells cylindric. Stipe cuticle below the lamellar attachment a cutis com- posed of loosely entangled hyphae. Clamp connections present (all parts).

Habit and Habitat: Uncommon; Solitary to scattered in humus beneath conifers in montane areas above 3000 feet elevation; northern California, particularly Lassen Volcanic National Park; June to July.

Material Studied: CALIFORNIA. Shasta County: HDT 12786 (HOLOTYPE: SFSU; Solitary in humus under conifers; Site 38, Lassen Volcanic National Park, elevation 7000 feet; 25 June 1965), HDT 12831; Trinity County: DLL 4253; Tuolumne County: HDT 12940.

Hygrophorus perfumus is characterized by the large size, moist to dry, white pileus, decurrent, white lamell- ae, white, dry stipe, aromatic odor, relatively long spores, and long basidia.

Hygrophorus subellenae Largent, H. subfusoideus Largent, and H. sordidus Peck are similar to H. perfumus because of their dry stipe, white carpophore, and lack of a partial veil. H. subellenae can be re- cognized by the basidiocarp that dries bright yellow, the furfuraceous to pruinose stipe-apex, and the moderately short, narrow basidia (43-51 x 7-8 µm). H. subfusoideus is distinctive by virtue of the subfusoid spores. H. sordidus can be distinguished by the narrowly elliptical spores that are 4.5 µm or less in width, a pointed stipe- base, and habitat under oaks.

Hygrophorus subalpinus Smith, although similar in size and color as H. perfumus can be differentiated by the fibrillose partial veil, subviscid stipe, and habitat in humus near melting snowbanks.

Hygrophorus pseudotephroleucus Largent. sp. nov.

Pileus 10-50 mm latus, primo convexus dein late convexus vel plano-convexus, primo viscidus dein siccus, appresso-fibrillosus vel lineatus, margine saepe crenulatus, appresso-squamulosus, fusce fulvido-brunneus. Odor et sapor non distincti. Lamellae adnatae vel subdecurrentes, albae. Stipe 30-65 mm longus, 5-10 mm latus, aequalis, rare clavatus, siccus, scaber punctatus, scaber fusce fulvido-brunneus, aliter albus. Sporae 8.1-10.7 x 4.6-6.1 µm, $\underline{x}$L 9.4 µm, $\underline{x}$W 5.4 µm, L-D 3.5-4.5 µm, Q 1.67-1.8, ellipticae. Basidia 42.7-47.8 x

6.1-8.1 µm, L/W 5.9-7.0, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens. Pileipellis ixotrichodermiformis, 300-350 µm crassa, cellulis terminalibus cylindricis, 9.3-73.8 x 2.4-3.7 µm. Caulocystidia abundantia, fasciculata, agglutinata, cylindro-clavata, 41.9-78.8 x 4.9-7.4 µm. Cuticularum hyphis incrustatis. Fibulae frequentes. Basidiocarpi dispersi ad terram sub *Pseudotsuga menziesii* et *Sequoia* sempervirente. Holotypus (DLL 5612) in HSU conservatus.

Pileus 10-50 mm broad, convex at first becoming broadly convex to plano-convex, outline often irregularly undulate; margin incurved and typically crenulate; surface viscid but soon dry, streaked and appearing appressed fibrillose, becoming squamulose-like towards the margin, shiny with age, dark yellowish brown (5-6,E,3-5), in some lighter on the margin; context thin and white except beneath the cuticle; taste and odor indistinctive. Lamellae adnate to slightly subdecurrent, close to subdistant, moderately broad, white; margin discoloring brunnescent and appearing eroded. Stipe 30-65 mm long, 5-10 mm broad at apex, equal except in some appearing enlarged at the very base, terete; surface dry, covered entirely with dark yellow brown (5-6,D-E,3-5), scabrous-like punctae, whitish beneath the punctae, becoming somewhat brunnescent at times; basal mycelium absent.

Spores 8.1-10.7 x 4.6-6.1 µm, $\underline{x}$L 9.4 µm, $\underline{x}$W 5.4 µm, L-D 3.5-4.5 µm, Q 1.67-1.8, elliptical, inamyloid. Basidia 42.7-47.8 x 6.1-8.1 µm, L/W 5.9-7.0, 4-spored; sterigmata up to 4.1 µm long. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent. Pileus trama distinct from the cuticle, hyphae entangled, up to 24.6 µm broad. Pileus cuticle a loosely entangled ixotrichodermium, 300-350 µm thick; terminal cells cylindric, 49.3-73.8 x 2.4-3.7 µm. Stipe cuticle at apex composed of dense clusters of agglutinated, cylindro-clavate, non-gelatinized caulocystidia, 41.9-78.8 x 4.9-7.4 µm. Pigmentation incrusted on the hyphae of the pileus cuticle. Clamp connections present (all parts).

Material Studied, Habit and Habitat: CALIFORNIA. Humboldt County: DLL 5612 (HOLOTYPE: HSU); scattered in humus beneath Douglas fir (*Pseudotsuga Menzièsii (Mirb.) Franco.) and Coast Redwood (Sequoia sempervirens* (D. Don) Endl.), HSU College Forest, Freshwater; 14 January 1973.

Hygrophorus pseudotephroleucus is distinguished by the viscid, appressed fibrillose, dark brown pileus with a crenulate margin, white, adnate lamellae with a brunnescent margin, entirely scarbrous-punctate stipe, elliptical spores and small basidia.

Five species of *Hygrophorus* are similar to *H. pseudotephroleucus* because of their furfuraceous punctate or fibrous punctate, dark stipe or their dark brown and fibrillose to fibrillose-squamulose veil which develops into irregular patches on the stipe. A summary of the main distinguishing features of these five taxa are as follows:

Hygrophorus pustulatus (Fr.) Fr.: Incrusted pigmentation, moderate basidia (48-63 x 7-10 µm), spores with xL <9.5 µm and xW between 5 and 6 µm, viscid pileus with punctae which become dark with age, fibrillose punctate stipe covered with a very thin gluten layer when young.

Hygrophorus tephroleucus (Fr.) Fr. sensu Hesler & Smith: Incrusted pigmentation, small basidia (40-58 x 6-8 µm), spores with an xL <9.5 µm and µm <5 µm, viscid pileus, with punctate which are paler than those of *H. pustulatus*, fibrillose stipe surface covered at first with a thin gluten layer.

Hygrophorus persoonii Arnolds: incrusted pigmentation, moderately long basidia (49-59 x 7.5-9.8 µm), spores with an average length of 11 µm and an average width of 6.8 µm, viscid pileus, lack of punctae, fibrillose to fibrillose scaly stipe from a distinct glutinous veil. In the past, this taxon was identified as *Hygrophorus olivaceoalbus* (Fr.:Fr.) Fr.

Hygrophorus inocybiformis Smith: vacuolar pigmentation, long basidia (55.8-83 x 10-13 µm, spores with an average length of 13.9 µm and an average width of 7.2 µm, dry pileus, no punctae, dry and fibrillose to fibrillose-scaly stipe, and a stature similar to that of an *Inocybe*

Hygrophorus morrissii Peck : vacuolar pigmentation (?), long basidia (44-74 x 5-7 µm), spores with an average length of between 9 and 10 µm and an average width of >5 µm but less than 6.8 µm, viscid pileus, furfuraceous -flocculent, dry(?) stipe which stains yellow on the stipe-base.

Hygrophorus pyrophilus Largent. sp. nov.

Pileus 20-60 mm latus, primo convexus vel plano--convexus et umbonatus, viscidus, glaber, primo lateritius vel badio-brunneus dein aurantiaco-rubellus vel aurantiacus aut flavidus. Odor et sapor non distincti. Lamellae subdecurrentes, subdistantes vel distantes, modice aurantiaco-flavus. Stipes 40-90 mm longus, 5-15 mm latus, aequalis, subviscidus, appresso-fibrillosus pileo concolor, rare unicolor. Sporae 7.6-10.6 x 4.6-5.6 µm, xL 8.70 µm, xW 5.0 µm, L-D 3.0-5.0 µm, Q 1.67-2.0, ellipticae. Basidia 47.8-53.8 x 5.1-7.1 µm, L/W 7.14-9.4, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens. Pileipellis ixotrichodermiformis, leviter evolutus, cellulis terminalibus cylindro-clavatus 32-110.8 x 6.16-7.4 µm. Stipitipellis ixocutiformis, cellulis terminalibus cylindricis, 49.3-134.5 x 2.46-3.7 µm. Fibulae frequentes. Basidiocarpi caespitosi carbonicolae. Holotypus (HDT 12011) in SFSU conservatus.

Pileus 20-60 mm broad, convex becoming plano-convex to umbonate, often irregular in outline; margin incurved becoming flared, highly eroded; surface glabrous to streaked from gluten or from irregular drying, viscid, variable in color, frequently entirely bright- to dark red ("brick red" to "pompeian red" to "maroon"), in others fading to moderate orange yellow to orange ("ochraceous salmon") in some the umbo becomes almost light grayish brown ("drab"), margin orange ("rufous") to moderate orange ("carnelian red") to moderate orange yellow, in some entirely a mixture of red and yellow pigments; context 2-3 mm thick near the disc, concolorous; taste and odor indistinctive. Lamellae subdecurrent, distant to subdistant, moderate orange yellow ("citrine drab") to pale yellow ("light ochraceous salmon"), sometimes with a slight reddish flush near the pileus; margin entire, concolorous. Stipe 40-90 mm long; 5-15 mm broad at apex, more or less equal, sometimes tapering at the very base; surface subviscid, appressed fibrillose to gluten-streaked, typically with age becoming fibrillose scaly, white, often almost concolorous with the yellow shades in the pileus, in others with red stains or flushes, rarely unicolorous; context stuffed then hollow, white and unchanging.

Spores 7.6-10.6 x 4.6-5.6 µm, $\bar{x}$L 8.70 µm, $\bar{x}$W 5.0 µm, L-D 3.0-5.0 µm, Q 1.67-2.0, elliptical, inamyloid. Basidia 47.8-53.8 x 5.1-7.1 µm, L/W 7.14-9.4, 4-spored; sterigmata up to 8.1 µm long and 1.0 µm wide. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent. Pileus cuticle an ixotrichodermium, up to 400 µm thick; hyphae entangled, slightly gelatinized; terminal cells cylindro-clavate, 32-110.8 x 6.16-7.4 µm. Stipe cuticle an ixocutis; terminal cells cylindric, 49.3-134.5 x 2.46-3.7 µm. Lactifers absent in the pileus trama. Clamp con- nections present (all parts).

Material Studied, Habit and Habitat: CALIFORNIA. Shasta County: HDT 12011 (HOLOTYPE: SFSU); Caespitose in burned areas in montane forests; Mt. Shasta area; 24 December 1964.

Hygrophorus pyrophilus is characterized by the bright- to dark red, viscid pileus that fades to a mixture of red and yellow, the orangish to orangish-yellow, subdecurrent lamellae, the subviscid, appressed-fibrillose, whitish tinged yellowish stipe, the habitat of growing in burned-over areas, elliptical spores and short basidia,

Because of the carpophore colors, *Hygrophorus pyrophilus* is related to *Hygrophorus speciosus* Pk. and *H. aureus* (Arrh.) Fr. *H. speciosus* is distinct by virtue of the orange red to orange to chrome yellow pileus, glutinous yellow stipe, spores 5-6 µm broad, and habitat of being scatttered to gregarious beneath larches or pines. *Hygrophorus aureus* sensu Bon (1977) and Moser (1983) can be recognized by having a smaller stipe (5-7 mm broad at apex), smaller spores (7-9 x 4-5 µm), pale yellowish lamellae and a habitat of growing beneath pines.

Hygrophorus sitchensis Largent. sp. nov.

Pileus 9-33 mm latus, convexus vel late convexus, rare umbonatus, margine primo fibrillosus vel pubescens dein pubescens vel glaber, crenulatus vel tuberculato-striatus, aliter glaber vel leviter fibrillosus, viscidus, albus, interdum pallide flavo-suffusus. Sapor non distinctus. Odor primo aromaticus dein amygdalinus. Lamellae adnatae vel subdecurrentes, subdistantes, albus, dein flavo-suffusus. Stipes 30-60 mm longus, apice 2-6 mm latus, basi 2-8 mm latus, primo viscidus dein subviscidus vel lubricus vel fere siccus, apice pruinosus vel tomentosus, aliter leviter fibrillosus vel glaber, albus et vulgo flavo-suffusus. Sporae 9.1-11.2 x 4.6-7.0 µm, xL 9.96 µm, xW 5.8 µm, L-D 2.5-4.5 µm, Q 1.4-2.1, ellipticae. Basidia 52.8-76.2 x 6.1-11.2 µm, L/W 6.5-8.6, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens. Pileipellis ixotrichodermiformis, 100-250 µm crassa, cellulis terminalibus cylindricis, 24.6-73.8 x 1.85-3.7 µm. Stipitipellis apice ixotrichodermiformis debliter evoluta, aliter ixotrichodermiformis, cellulis terminalibus cylindricis vel cylindro-clavatis, 39.4-73.8 x 1.85-7.4 µm. Fibulae frequentes. Basidiocarpi dispersi vel gregarii in humo sub *Picea sitchensis*. Holotypus (DLL 8675) in HSU conservatus.

Pileus 9-33 mm broad, convex to broadly convex, in some obscurely and broadly umbonate; margin incurved, opaque, and finely fibrillose to pubescent at first, becoming decurved and glabrous to pubescent with age, often crenulate to slightly tuberculate-striate and then scalloped in appearence; surface not hygrophanous, shiny, viscid, glabrous to finely fibrillose, white and in some developing a very pale yellow (4,A,1-2) tinge; context 1-2 mm thick near the disc, white and unchanging; taste indistinct; odor distinctly aromatic at first to nearly almond-like with age. Lamellae adnate to subdecurrent, subdistant, narrow to moderately broad (2-3 x 7-8 mm), white and in some discoloring yellowish; margin even, entire, and concolorous. Stipe 30-60 mm long, 2-6 mm broad at apex, 2-8 mm broad at base, equal to tapered at apex, usually terete but at times flattened and then 3x5 mmat apex and 5x7 mmat base; surface viscid when fresh, then subviscid to lubricous to even dry with age, pruinose to tomentose at apex, finely fibrillose to glabrous elsewhere, white, typically yellowish (4,A,2-5) at base; stipe-base yellow with 3% KOH; basal tomentum absent.

Spores 9.1-11.2 x 4.6-7.0 µm, xL 9.96 µm, xW 5.8 µm, L-D 2.5-4.5 µm, Q 1.4-2.1, elliptical, smooth, not constricted, inamyloid. Basidia 52.8-76.2 x 6.1-11.2 µm, L/W 6.5-8.6, 4-spored; sterigmata 10.2-12.2 x 1.5-2.1 µm. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent, with a broad mediostratum and narrow lateral strata; spleasily when fresh. Pileus trama distinct from the cuticle, composed of entangled hyphae; hyphae 7.4-24.6 µm. Pileus cuticle an entangled ixotrichodermium, 100-250 µm thick; terminal cells cylindric, 24.6-73.8 x 1.85-

3.7 µm. Stipe cuticle a poorly developed ixotrichodermium at apex, more developed elsewhere; terminal cells cylindric to cylindro-clavate, 39.4-73.8 x 1.85-7.4 µm. Lactifers present in the stipe trama; absent elsewhere. Clamp connections present (all parts).

Habit and Habitat: Abundant in coastal northwestern California, rare to absent elsewhere; scattered to gregarious in needle humus beneath Sitka Spruce (*Picea sitchénsis* (Bong.) Carr.; Patrick's Point State Park, Humboldt county; January to February.

Material studied: CALIFORNIA. Humboldt county: DLL 8383, 8675 (HOLOTYPE: HSU; scattered to gregarious in needle humus, with or without mosses, beneath Sitka Spruce (*Picea sitchénsis* (Bong.) Carr.); Patrick's Point State Park; 23 January 1984).

Hygrophorus sitchensis is distinguished by the viscid, white pileus with a pubescent and crenulate margin, the white, adnate lamellae, the viscid stipe, with a pruniose to tomentose and a yellow base, the aromatic odor, and large spores.

In California, *Hygrophorus eburneus* (Fr.) Fr. , *H. occidentalis* Smith & Hesler, and *H. cossus* (Sow. : Fr.) Fr. can be confused with *H. sitchensis* because of their white carpophore colors, their slender to moderately broad ((2-)5-15 mm broad at the apex), viscid stipe. In these fungi, the pileus color may become yellowish or even greyish (in one) and the pileus margin is usually whitish to pallid. *H. eburneus* sensu Hesler & Smith (1963)is distinguished by the glutinous to viscid pileus and stipe which at most becomes yellowish, lack of a distinctive odor, and spores with a *x*L <9.0 µm and *x*W of 5.0 µm. *Hygrophorus occidentalis* is distinctive by virtue of the glutinous to viscid, medium sized (20-60 mm across), medium to dark grey pileus with a pallid to off-white margin, viscid to glutinous, white stipe with a pale grey apex and pale yellow base, and indistinct or slightly fragrant odor. *Hygrophorus cossus* (Sow. : Fr.) Fr. in Dähncke and Dähncke (1980) is characterized by the white pileus tinged yellowish, slightly viscid, white stipe not yellowing but becoming brownish, spores with an *x*L of 7.0 µm and *x*W of 4.5 µm, and most typically by the unpleasant, goat-moth catepillar odor.

H. subpungens Sm. & Hes., *H. pusillus* Pk., and *H. piceae* Küner, although similar in color as *H. sitchensis*, can be differentiated by their dry stipe and their pileus which is tinged pinkish, reddish or yellow brown.

Hygrophorus subellenae Largent. sp. nov. (etym.: sub = near)

Pileus 40-90 mm latus, primo convexus dein late convexus vel plano-convexus aut planus et depressus, interdum umbonatus, primo glutinosus vel viscidus, dein subviscidus, glaber, albus, discus interdum pallide flavido-suffusus. Sapor non distinctus. Odor non distinctus vel parum aromaticus. Lamellae adnatae vel subdecurrentes vel decurrentes, albae. Stipes 40-80m longus, 10-15 mm latus, aequalis, siccus, furfuraceus vel squamulosus, rare subglaber. Sporae 7.6-10.2(-11.2) x 4.1-7.1 µm, $\underline{x}$L 8.8 µm, $\underline{x}$W 5.3 µm, L-D 2.0-5.0 µm, Q 1.4-2.0, ellipticae vel peranguste ellipticae. Basidia 42.7-50.8 x 7.1-8.1 µm, L/W 6.0-6.85, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens. Pileipellis ixotrichodermiformis, 600-1500 µm crassa, cellulis terminalibus cylindricis 24.6-73.8 x 2.46-4.92 µm. Stipitipellis constans ex abundantis, fasciculatis agglutinatis hyphis, cellulis terminalibus similis pileipelli. Fibulae frequentes. Basidiocarpi gregarii vel caespitosi ad terram silvaticum. Holotypus (HDT 24459) in SFSU conservatus.

Pileus 40-90 mm broad, convex when young becoming at maturity broadly conex to plano-convex to plane with a shallow depression on the disc, often subumbonate to broadly umbonate; margin incurved and entire; surface viscid to glutinous when wet, subviscid to dry with age, glabrous, not hygrophanous; white, unchanging or becoming very slightly pale yellowish to apricot ("apricot yellow") on the disc; context 3-5 mm thick near the disc, white, unchanging; taste indistinctive; odor weakly aromatic to indistinct. Lamellae adnate then subdecurrent to decurrent, moderately broad, subdistant to distant, white, unchanging; margin entire and concolorous. Stipe 40-80 mm long, 10-15 mm broad at apex, equal, terete; surface dry, minutely furfuraceous to somewhat scaly, at times nearly glabrous, white, unchanging; veil absent; context white, stuffed, at times becoming hollow, unchanging. Dried herbarium specimens bright yellow.

Spores 7.6-10.2(-11.2) x 4.1-7.1 µm, $\underline{x}$L 8.8 µm, $\underline{x}$W 5.3 µm, L-D 2.0-5.0 µm, Q 1.4-2.0, elliptical to narrowly elliptical, inamyloid. Basidia 42.7-50.8 x 7.1-8.1 µm, L/W 6.0-6.85, 4-spored; sterigmata up to 5.1 µm long. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent. Pileus cuticle an ixotrichodermium, 600-1500 µm thick; terminal cells cylindric, 24.6-73.8 x 2.46-4.92 µm. Stipe cuticle at apex composed of agglutinated clusters of non-gelatinized hyphae; terminal cells similar to the pileus cuticle. Clamp connections present (pileus cuticle, stipe cuticle, basidia).

Habit and Habitat: Uncommon; Gregarious to caespitose in humus of mixed woods, Mendocino county; December.

Material Studied: CALIFORNIA. Mendocino County: HDT 24459 (HOLOTYPE: SFSU; Caespitose in humus of mixed woods, Jackson State Forest; 6 December 1969); HDT 24475.

Hygrophorus subellenae is distinguished by the white, viscid pileus with a slightly yellow disc, white, adnate to decurrent lamellae, dry, white stipe with at least a furfuraceous or scaly apex, weakly aromatic odor, moderately long spores, short basidia, and bright yellow herbarium specimens.

The stature, spore size, basidia, and ornamentation of the stipe agree with the features described for Hygrophorus ellenae Hes. & Smith which can be recognized by virtue of the apricot tinged lamellae, stipe-apex less than 10 mm broad, and slightly viscid pileus .

Because of their stature and colors, the following species of Hygrophorus can be confused with H. subellenae.: H. sordidus Peck which differs by the pointed stipe base, spores with xW <5.0 μm and habitat beneath oaks; H. perfumus Largent which can be differentiated by the spores with xL >9.5 μm, broader basidia (9-11 μm), dry, glabrous stipe and aromatic, perfume-like odor; and H. subalpinus Smith which is distinctive because of the subviscid stipe with a fibrillose partial veil, mild to pungent odor, and longer basidia.

Hygrophorus subfusoideus Largent. sp. nov.

> Pileus 50-85 mm latus, planus, glaber, viscidus, primo albidus aut pallide vel modice flavus, dein saepe flavo-tinctus. Odor et sapor non distincti. Lamellae decurrentes, albidae vel pallide-flavidae. Stipes 50-70 mm longus, 16-20 mm latus, glaber, siccus, pileo concolor. Sporae 7.6-10.2(-11.2) x 3.6-4.6 μm, xL 9.0 μm, xW 4.1 μm, L-D 3.5-6.5 μm, Q 1.88-2.50, peranguste ellipticae vel subfusoideae. Basidia 43.7-55.8 x 6.1-8.1 μm, L/W 7.16-7.86, 4-spora. Pleurocystidia et cheilocystidia absentia. Lamellarum trama divergens, hyphis 36.3-49.3 x 3.7-12.3 μm. Pileipellis ixotrichodermiformis, 200-400 μm crassa, cellulis terminalibus cylindricis, 24.6-73.8 x 1.23-3.08 μm. Stipitipellis cutiformis, cellulis terminalibus cylindricis, 24.6-73.8 x 2.46-4.92 μm. Fibulae frequentes. Basidiocarpi solitarii vel dispersi ad terram sub Abiete concolori. Holotypus (Wright 1033) in HSU conservatus.

Pileus 50-85 mm broad, plane with an upturned, slightly undulate margin; surface glabrous, viscid, not hygrophanous, whitish or pale to medium yellow, often staining yellow when rubbed; context white to pale yellowish orange; taste and odor indistinctive. Lamellae decurrent, whitish to pale yellowish, subdistant, moderately broad (up to 6.5 mm); margin entire and concolorous. Stipe 50-70 mm long, 16-20 mm broad; variable in shape, either tapered downward or clavate; glabrous to more or less silky, dry, concolorous with pileus; context fleshy fibrous, solid to stuffed, dull yellowish orange.

Spores 7.6-10.2(-11.2) x 3.6-4.6 μm, xL 9.0 μm, xW 4.1 μm, L-D 3.5-6.5 μm, Q 1.88-2.50, narrowly elliptical to subfusoid, inamyloid. Basidia 43.7-55.8 x 6.1-8.1 μm, L/W 7.16-7.86, 4-spored; sterigmata up to 3.1 μm long and .75 μm wide. Pleurocystidia and cheilocystidia absent. Lamellar trama divergent; mediostratum up to 24.6 μm broad, lateral strata up to 73.8 μm broad, hyphae 36.3-49.3 x 3.7-12.3 μm. Pileus trama distinct from the cuticle; hyphae densely entangled, 4.9-17.2 μm broad. Pileus cuticle an ixotrichodermium, 200-400 μm thick, easily separable from the trama; terminal cells cylindric, 24.6-73.8 x 1.23-3.08 μm. Stipe cuticle a cutis; terminal cells cylindric, 24.6-73.8 x 2.46-4.92 μm. Lactifers absent. Clamp connections present (all parts).

Material Studied, Habit, and Habitat: CALIFORNIA. Kern County: Wright 1033 (HOLOTYPE: HSU); Solitary to scattered on dirt with White Fir, about 6500 feet elevation, Mt. Pinos; 3 April 1978.

Hygrophorus subfusoideus is characterized by the whitish to yellowish pileus, lamellae and stipe, viscid pileus, relatively short basidia, and narrowly elliptical to subfusoid spores.

Several species of Hygrophorus can be confused with H. subfusoideus because of their large, white or yellow carpophore. Hygrophorus subsordidus Murr. differs by the smaller and narrower spores (6-8x 3-4 μm), shorter basidia (35-44 x 5-6 μm), and narrow, adnexed lamellae. Hygrophorus sordidus Pk. is distinct because of the smaller spores (5.6-7.6 μm), bitter taste, and habitat under oaks. Hygrophorus gliocyclus Fr., H. whiteii Hes. & Sm., and H. flavodiscus Frost apud Pk. possess a glutinous pileus and stipe.

ACKNOWLEDGMENTS

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I am particularly grateful to Joe Ammirati, University of Washington who provided me with most of the literature needed to study Hygrophorus and to Alexander H. Smith who provided me with an unpublished manuscript which has been used in this paper. I would also like to thank Don Rogers and Ellen Thiers for their assistance in the latin diagnoses and Roy Watling, Royal Botanic Gardens, Edinburgh, for reviewing the manuscript.

Finally, the superb collecting efforts and research in agarics of Harry D. Thiers must be recognized without which the study of these fungi in California would still be in its initial stages.

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MYCOTAXON

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THE NOMENCLATURAL FATE OF RHIZOPHAGITES ACINUS

SHANNON M. BERCH*

Dep. d'Ecologie et Pedologie, Faculte de Foresterie et Geodesie,
Universite Laval, Quebec, Canada G1K 7P4

Article 58 of the International Code of Botanical Nomenclature (ICBN) (Voss et al. 1983) states:

"When a non-fossil taxon of plants, algae excepted, and a fossil or sub-fossil taxon of the same rank are united, the correct name of the non-fossil taxon is treated as having priority."

A case in which this Article must be invoked has come to light as a result of investigation of fossils resembling the chlamydospores formed by modern species of _Glomus_ Tul. & Tul. (Endogonaceae, Zygomycetes), a genus originally described in 1845. Rosendahl (1943) proposed the new genus _Rhizophagites_ for two species of fossil fungi characterized by coenocytic, thick-walled "vesicles" varying from 42-46 um to 103-124 um. He recognized the similarity of these fossils to the chlamydospores of modern fungi that form vesicular-arbuscular mycorrhizae (VAM), the mutualistic symbiosis that had been mistakenly described under the name _Rhizophagus_ Dangeard (1896) as the cause of a poplar decline disease. Butler (1939), in considering the systematic position of the VAM-forming fungi, had also indicated the presence in the fossil record of chlamydospores of the type produced by these fungi which he informally referred to as _Rhizophagus_. Rosendahl and Butler were possibly not aware that the name _Glomus_ had previously been proposed for extant fungi which produce chlamydospores of this type and which had been linked to the formation of VAM (Peyronel 1923).

In their monograph of the Endogonaceae, Gerdemann and Trappe (1974) synonymized both _Rhizophagus_ and _Rhizophagites_ with _Glomus_ Tul. & Tul., and the type species _Rhizophagites butleri_ Rosendahl with _Glomus fasciculatum_ (Thaxter) Gerdemann & Trappe. However, they did not deal with the other two species _R. minnesotensis_ Rosend. and _R. acinus_ Srivastava (Srivastava 1968).

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*Current address:

U. S. Department of Agriculture Forest Service
Pacific Northwest Forest and Range Experiment Station
Forestry Sciences Laboratory
Corvallis, Oregon 97331

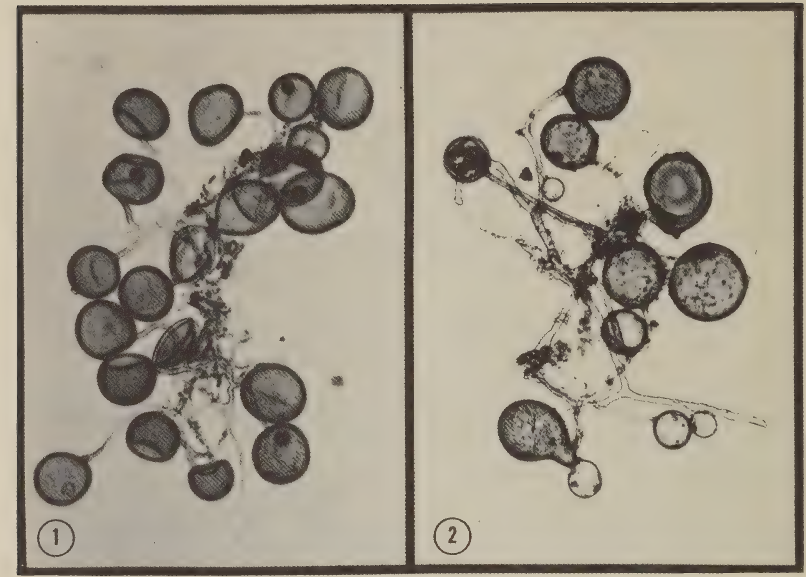

Figure 1. Rhizophagites acinus Srivastava, chlamydospores from holotype, X 150. Figure 2. Glomus deserticola Trappe, Bloss & Menge, chlamydospores from holotype, X 150.

I have examined the type material of R. acinus (Fig. 1) and found it to be conspecific with Glomus deserticola Trappe, Bloss & Menge (Fig. 2). Therefore, in compliance with Article 58, the following synonymy is proposed:

Glomus deserticola Trappe, Bloss & Menge, Mycotaxon 20:123. 1984.
=Rhizophagites acinus Srivastava, Can. J. Bot. 46:1117. 1968.

Srivastava described the spores of R. acinus in the following terms: "Vesicles spherical to subspherical, sometimes pyriform; usually darker in color than mycelia; mycelia at the base of vesicles form its stalk, stalk diameter uniform, stalk wall about 3.5 to 4 microns thick, double-layered; outer layer smooth, continuous with the stalk wall, denser than stalk wall and mycelium, about 1.5 to 2 microns thick, inner layer 1.8 to 2 microns thick, baculate, continuous all around inside the vesicle, forms a plug-like structure at the contact of the vesicle with the stalk; surface ornamentation infrareticulate, reticulum size less than 1 micron. Size range: vesicle size 50 to 80 microns (holotype 52.8 microns)."

In the original description of G. deserticola, Trappe et al. (1984) report a spore size range of (47-)54-115 x (38-)52-102 um, which exceeds on both ends of the scale that reported for spores (called vesicles in the original publication) of R. acinus. Spore and sporogenous hypha walls of G. deserticola are reddish-brown, single and laminated; those of R. acinus are reported to be composed of two distinct layers. I found that spores of the type of R. acinus have a reddish-brown, single, sometimes laminated wall. Reticulation was not found on the spore surface of R. acinus; G. deserticola spores are also smooth. In addition, the "plug-like structure at the contact of vesicle with the stalk" of R. acinus is an inner mounded collar projecting toward the center of the spore as occurs in G. deserticola.

The type materials of R. butleri and R. minnesotensis could not be found at the University of Minnesota and probably have been lost. Article 9.3 of the ICBN permits the typification of the name of a species of recent plant or, by implication, fungus by a figure or description in the event that the type specimen has not been preserved. Names of fossil taxa are not referred to in Article 9.3 but Article 9.4 states:

"One whole specimen used in establishing a taxon of fossil plants is to be considered the nomenclatural type...."

Since the type specimens of R. butleri and R. minnesotensis have apparently been lost, these two names are nomina dubia.

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MYCOTAXON

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Acaulospora sporocarpia, a new, sporocarpic species, and emendation of the genus Acaulospora (Endogonaceae, Zygomycotina)

Shannon M. Berch

U. S. Department of Agriculture Forest Service,
Pacific Northwest Forest and Range Experiment Station,
Forestry Sciences Lab, 3200 Jefferson Way,
Corvallis, Oregon 97331, U.S.A.

Mosse (5) and Gerdemann (2) pioneered the identification of vesicular-arbuscular mycorrhizal (VAM) fungi. They used VAM fungi that produce nonsporocarpic spores on individual hyphae in the host rhizosphere to demonstrate the formation of VAM. Some of these fungi can now be identified as species of Glomus and Gigaspora. It has subsequently been shown that some earlier described sporocarpic species, such as Glomus microcarpum Tul. & Tul. (11) and Glomus macrocarpum Tul. & Tul. (11), are VA mycorrhizal and form nonsporocarpic (ectocarpic) as well as sporocarpic spores. Before recognition of their specialized nutrition and distinctive spore morphology, these fungi were generally referred to the genus Endogone Lk.:Fr. along with a number of what we now know to be non-VAM species (e.g., 9).

When Gerdemann and Trappe (3) reexamined the Endogonaceae, they recognized and separated from Endogone the distinct genera of VAM fungi, Glomus, Acaulospora and Gigaspora, which are differentiated by spore ontology and morphology. No sporocarp-forming species were then known for either of the last two genera. I have recently examined two previously unidentified collections of sporocarpic Endogonaceae and found them to be an undescribed species of Acaulospora.

Acaulospora sporocarpia Berch, sp. nov. (Figs. 1, 2 & 3)

Sporocarpia irregularia, brunneola vel atrobrunnea, usque ad 2.5 x 1.5 x 1.5 cm, sporis nigris luce reflexa. Sporae lateraliter gestae in hypha cum terminatione inflata globosa, subglobosa vel irregulares et 210-275 x 210-250 um. Sporae ellipsoideae, late fusiformes, subglobosae vel globosae, (140-)160-200(-240) x (125-)150-175(-200) um, atrobrunneae vel nigrae luce transmissa, pedicella singula usque ad 40 um longa et 20-30 um crassa. Sporae tunica stratis duplicibus: exteriore obscure castaneo, 2.5-5 um crasso, lamellato, aspro; interiore hyalino, 7-15 um crasso, lamellato, ubi obtrito aliquando in strata duo secedenti.

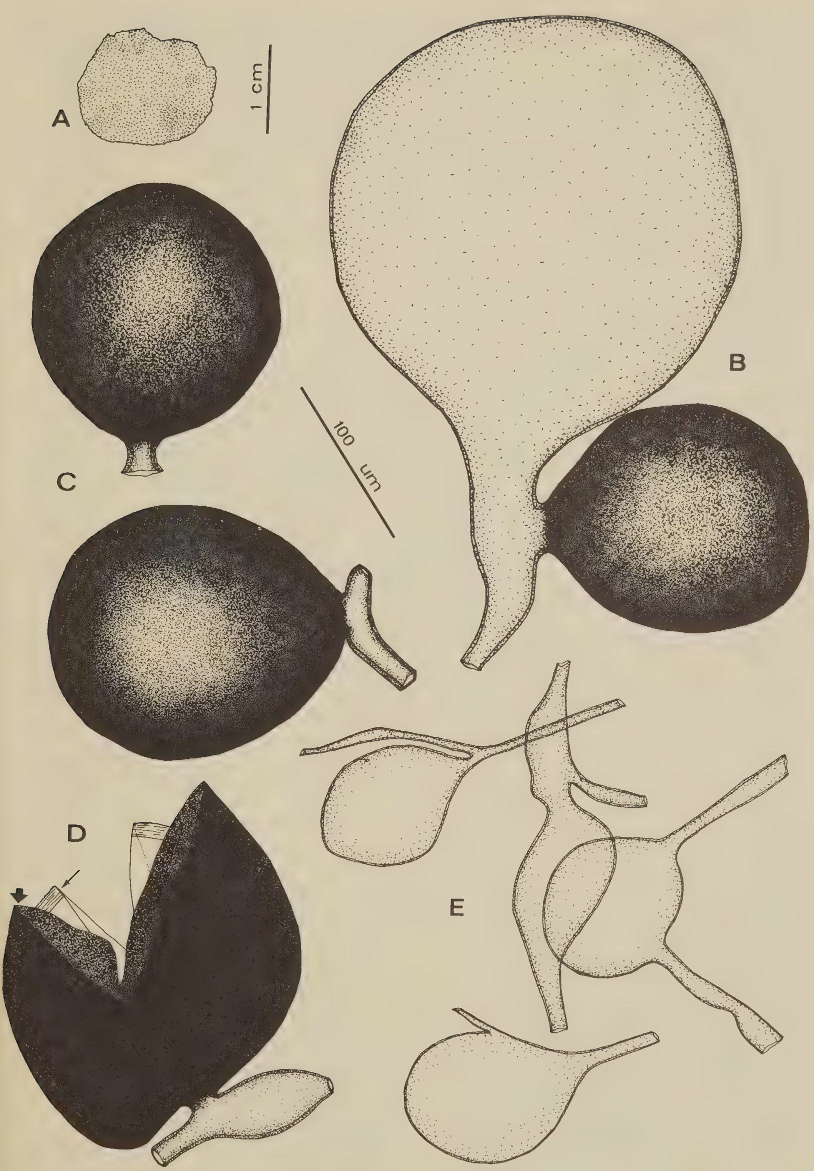
Sporocarps irregular, dark-brown, up to 2.5 X 1.5 X 1.5 cm, composed of spores that appear black in incident light, plus sporogenous saccules, hyphal swellings, hyphae and debris.

Spores formed laterally on hypha subtending a single, terminal sporogenous saccule. Spores ellipsoid, broadly fusiform, subglobose, or globose, (140-)160-200(-240) X (125-)150-175(-200) um, dark brown or black in transmitted light, borne on a single stalk.

Wall of spore composed of two separable groups: the outer consists of a single wall (wall 1), dark reddish brown in transmitted light, 2.5-5 um thick, laminate, with a rough outer surface; the inner consists of a single wall (wall 2), hyaline, 7-15 um thick, tough, laminate, and sometimes separating into 2 or more layers when crushed.

Stalk continuous with hypha that subtends the sporogenous saccule, may be persistant, brown, up to 40 um long and 20-30 um wide at the point of attachment to the spore.

Fig. 1. Acaulospora sporocarpia, holotype. A. Cross-section of sporocarp, bar = 1 cm. B, C, D, E, bar = 100 um. B. Dark spore formed laterally on hypha subtending terminal sporogenous saccule. C. Mature spores with remnants of subtending hyphae. D. Crushed spore with dark outer wall broken and hyaline inner wall exposed. E. Terminal, lateral and intercalary hyphal swellings found in sporocarp.


A
1 cm
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100 um
D
E

Sporogenous saccule globose, subglobose, or irregular, 210-275 X 210-250 um. Subtending hypha is up to 50 um wide at point of attachment to sporogenous saccule.

Hyphal swellings irregular, subglobose or globose, terminal, lateral or intercalary, and up to 40 um long.

HOLOTYPE: USA, Arizona, Coconino Co., approx. 70 km SW of Winslow, Barrowed Tank, in soil, VIII.1955, D. J. Stouffer, BPI.

OTHER MATERIAL EXAMINED: West Pakistan, Hyberabad, on the ground, 20.IV.1962, S. Ahmad 15636, IMI 95697.

Because this species is known only from herbarium collections, it has not been possible to determine whether it forms mycorrhizae. The West Pakistan collection is composed of part of a mature sporocarp, a large amount of immature material and debris.

The two collections examined differ in a number of individually minor ways. Spores of the holotype undergo a rapid and distinctive reaction in Melzer's reagent as is common to *Acaulospora* species: the inner wall changes from hyaline to bright orange-pink or red-purple. No color change was observed for the material from Pakistan under the same conditions. The sporocarp from Pakistan is light brown and the spores do not exceed 190 um. The sporocarps from Arizona are dark brown and the spores attain a maximum length of 240 um. Somewhat different spore size range is by itself not sufficient reason

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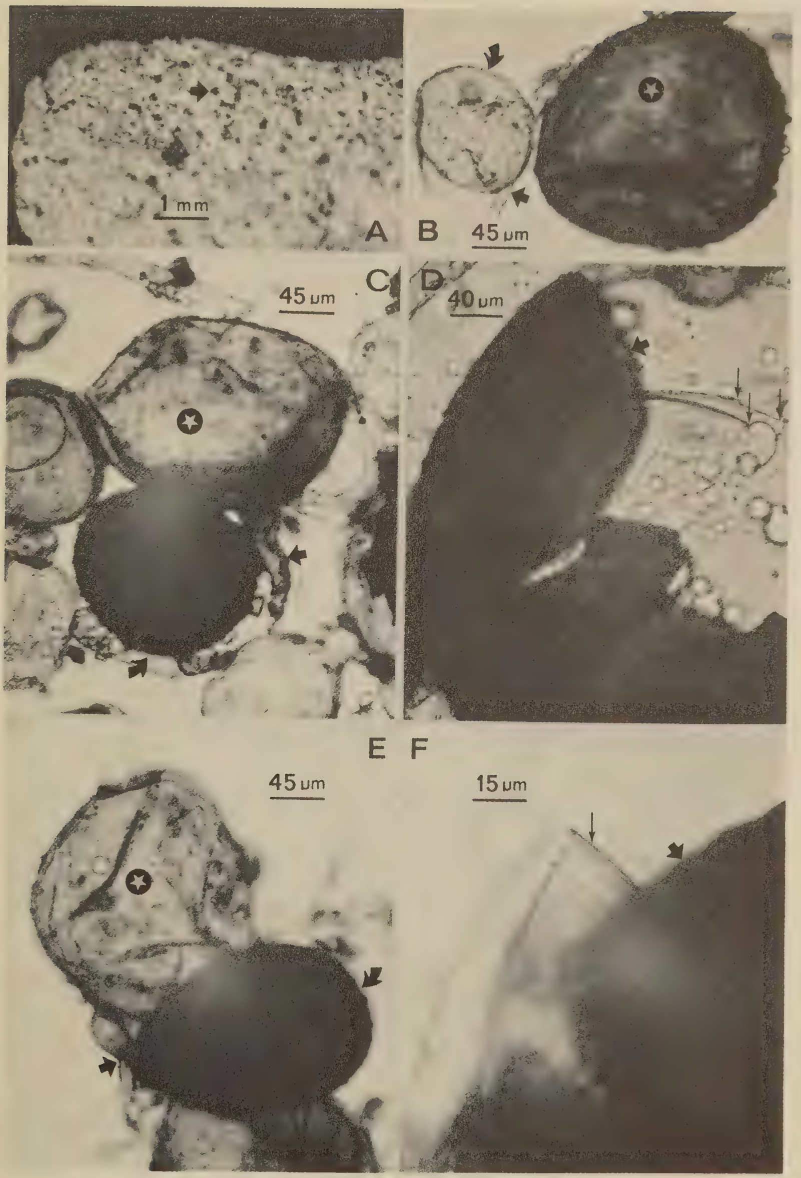
Fig. 2. *Acaulospora sporocarpia*, holotype. A. Section of sporocarp with exposed dark spores embedded in glebal hyphae, bar = 1 mm. B, C, E, bar = 45 um. B. Young spore (curved arrow) forming on hypha (straight arrow) subtending terminal sporogenous saccule. C. Mature, dark spore on hypha (arrow) below terminal sporogenous saccule (star). D. Crushed spore with dark, outer spore wall (large arrow), and layers of hyaline, membraneous inner wall (small arrow), bar = 40 um. E. Ellipsoid spore (curved arrow) attached to hypha (straight arrow) subtending terminal, sporogenous saccule (star). F. Crushed spore with broken outer wall (large arrow) and exposed hyaline inner wall (small arrow), bar = 15 um.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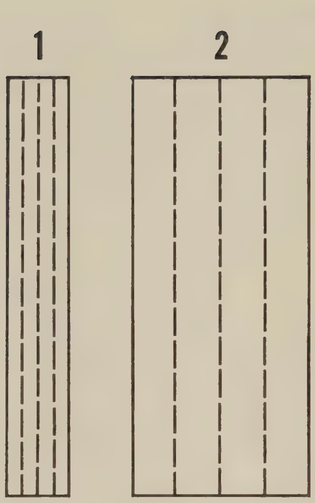

Fig. 3. Murograph of *Acaulospora sporocarpia.*

to warrant erection of two distinct taxa and may reflect differences in maturity. The difference in reaction to Melzer's reagent is troublesome. Most, if not all, species of *Acaulospora* react in Melzer's reagent and a collection that does not certainly warrants notice. In combination with the differences in spore size range and sporocarp color, it may seem that the two collections are of different species. However, I know neither how stable this reaction is over time and under different conditions nor how variable sporocarp color and spore size range are in this taxon as0000ave seen so few collections. Perhaps once fresh material is examined, this situation will be clarified.

Acaulospora sporocarpia is the only known species of the genus to have dark brown to black spores that are somewhat roughened but otherwise not ornamented and a relatively thick, tough, inner wall (Table 1). Thus, ectocarpic spores of this species, should they exist, would be readily identifiable. In *A. elegans* Trappe & Gerd., the dull, dark brown spores are reticulate and ornamented with spines, and rods (3). The surface of the red-brown to brown-black spores of *A. foveata* Trappe & Janos is pitted (4). Reticulation and cerebriform folds ornament the brown spores of *A. gerdemannii* Schenck &

Table 1: Comparison of Acaulospora species.

Species	Spore color	Outer wall group color	Ornamentation Outer wall	Ornamentation Inner wall	Reference
appendicula	yellow cream to orange tan	yellow to brown	roughened warts	smooth	8
bireticulata	light brown	gray green to gray brown	polygonal reticulum	smooth	7
elegans	dull dark brown	brown	spines, rods, reticulation	smooth	3
foveata	red brown to brown black	brown	pitted	smooth	4
gerdemannii	brown	brown	reticulate, cerebriform	alveolate reticulum	6
laevis	yellow brown red brown or olive brown	yellow brown, red brown	roughened	innermost roughened	3
longula	light yellow	light yellow	smooth	innermost roughened	8
mellea	yellow	golden	smooth	innermost roughened	8
morrowae	yellow	golden yellow	smooth	innermost roughened	8
nicolsonii	hyaline to pale yellow	pale yellow	granular, network	smooth	12
scrobiculata	light olive, light brown	subhyaline, yellow gray	pitted	innermost roughened	10
spinosa	yellow-brown	yellow brown, red brown	spines,rods, partial reticulum	smooth	13
sporocarpia	black	dark red, brown	roughened	smooth	
trappei	subhyaline	subhyaline	smooth	smooth	1
tuberculata	yellow brown, red black	yellow, brown	tubercles	smooth	4

Nicolson (6). The yellow-brown to red-black spores of A. tuberculata Janos & Trappe are covered with tubercules (4).

Schenck et al. (8) discussed the formation of Glomus-like chlamydospores and thin-walled "vesicle-like" structures by *Acaulospora appendicula* Spain, Sieverding & Schenck. *Acaulospora sporocarpia* forms terminal, intercalary and lateral hyphal swellings or "vesicles" in its sporocarps. I do not know whether these structures of *A. appendicula* and *A. sporocarpia* are homologous to those of *Glomus*, and thereby could be thought to link *Acaulospora* with *Glomus* as was suggested by Schenck et al. (8).

Acaulospora sporocarpia is the first species of the genus known to produce spores in sporocarps. The term sporocarp is broadly defined here: a spore-producing body that is not necessarily differentiated into distinct tissue layers, may be indeterminate in its growth form, and may encompass debris. In *Glomus* Tul. & Tul., another member of the Endogonaceae, sporocarp formation is known for some but not all species; others are capable of both types of spore-formation. Given this precedent and the fact that spore development and morphology in *A. sporocarpia* are similar to those in the nonsporocarpic species of *Acaulospora*, a new genus is not needed for the sporocarpic forms. To include this taxon in *Acaulospora*, I emend the generic definition:

Acaulospora Gerdemann & Trappe emend. Berch

Spores produced singly in soil or in sporocarps that may attain several cm in length; spores globose, subglobose, ellipsoid, or broadly fusiform, with oily contents; borne laterally on the subtending hypha of large, terminal, relatively thin-walled, sporogenous saccule. Terminal sporogenous saccule may be up to twice the size of spore; contents transferred to developing spore. Spore composed of essentially two distinct, separable wall groups: at least part of outer is continuous with wall of subtending stalk, may be pigmented, laminated or composed of distinct walls, and variously ornamented; inner is composed of one or more walls that are usually membranous, hyaline, may be laminated, ornamented, and stain pink, red, or purple in Melzer's reagent. Pore in stalk that subtends spore is occluded by part of the outer spore wall group.

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I thank Jim M. Trappe, Michael A. Castellano, and Steven E. Carpenter for reviewing the manuscript, and National

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MYCELIOPHTHORA VELLEREA (*CHRYSOSPORIUM ASPERATUM*) ANAMORPH OF *CTENOMYCES SERRATUS*.

J. Guarro, L. Punsola and J. Cano

Departamento de Biología y Microbiología. Universidad de
Barcelona. Facultad de Medicina. Reus, Tarragona, España

SUMMARY

The types and several other collections of Myceliophthora vellerea (Chrysosporium asperatum) were examined. Myceliophthora anamorph of Ctenomyces serratus Eidam is placed in synonymy with Myceliophthora vellerea (Sacc. & Speg.) v. Oorschot on basis of sexual compatibility. The relationships of this species to other with similar conidial ornamentations are discussed.

INTRODUCTION

The genus *Myceliophthora* Cost. was reintroduced by van Oorschot (1977) for several species of *Chrysosporium* Corda bearing blastoconidia on ampulliform swellings with narrow basal attachments, *Chrysosporium* was retained for species with thalloconidia.

Among the species listed by van Oorschot (1980) in *Myceliophthora* were *Chrysosporium asperatum* Carmichael and *C.* anamorph of *Ctenomyces serratus* Eidam. The former, erected by Carmichael (1962) was redisposed in *Myceliophthora* as *M. vellerea* (Sacc. & Speg.) van Oorschot (1980). The latter was described in detail by Frey & Griffin (1961), but not named. Other workers later (Carmichael, 1962. Dominik, 1967) classified it under *Chrysosporium*.

The two species in question appear very similar. Carmichael (1962) and van Oorschot (1980) separated them on the basis of colony colour and growth rate and conidial dimensions. However, after examining a series of isolates from various Spanish soils the above criteria did not prove to be of much taxonomic value as intermediate characters were frequent. The suspected conspecificity of these two organisms was tested by comparing our isolates with those from international culture collections and also by pairing strains of *M. vellerea* with tester strains (+) and (-) of *M.* anamorph of *Ctenomyces serratus.*

MATERIALS AND METHODS

Morphological and cultural characters of all isolates were studied on Phytone yeast extract agar (PYE) (Carmichael, 1962), potato dextrose agar (PDA) and Czapek agar. Conidia were measured on camera lucida drawings from slide culture preparations.

The following isolates were examined:
Strains previously identified as *M.* anamorph of *C. serratus* : UAMH 3090= IMI 89564, (+) mating type, from soil, C.O. Dawson, Berkshire, England, 1961; UAMH 3197= IMI 89563, (-) mating type, from soil, C.O. Dawson, Berkshire, England, 1961. Strains previously identified as *M. vellerea*: CBS= 169.62= ATCC 14801= IMI 94289= UAMH 560= IFO 7582, type strain of *Chrysosporium asperatum*, from soil, Alberta, Canada, 1956; UAMH 564, from soil, J.W. Carmichael, Alberta, Canada, 1956; UAMH 3173, from soil, P.V. Kurup, Ohio, USA, 1969. Strains recently isolated by us in Spain: FMR 700, from arable soil, L. Punsola, Claravalls, LLeida, 1980; FMR 701, from garden soil, L. Punsola, Freginals, Tarragona, 1981; FMR 702, from forest soil, L. Punsola, Sant Celoni, Barcelona, 1982; FMR 703, from arable soil, L. Punsola, Banyoles, Girona, 1982; FMR 704, from arable soil, L. Punsola, El Prat, Barcelona, 1982; FMR 705, from arable soil, L. Punsola, El Prat, Barcelona, 1982; FMR 706, from garden soil, J. Cano, La Selva, Tarragona, Spain, 1983; FMR 707, from arable soil, V. Punsola, Ainsa, Huesca, 1980; FMR 708, from garden soil, V. Punsola, Ainsa, Huesca, 1980; FMR 709, from garden soil, A. Muntaner, Ciutadella, Menorca, 1983; FMR 710, from arable soil, A. Muntaner, Sant Antoni, Ibiza, 1983; FMR 711, from arable soil, A. Muntaner, Rafal Rubi, Menorca, 1983; FMR 712, from arable soil, A. Muntaner, Ses Olleries, Mallorca, 1983; FMR 713, from arable soil, J. Cano, Onda, Castellon, 1983; FMR 714, from forest soil, A. Muntaner, Manut, Mallorca, 1982; FMR 715, from arable soil, L. Punsola, Calafell, Barcelona, 1981; FMR 716, from forest soil, A. Muntaner, Son Bou, Menorca, 1983.

The media used for mating experiments were: Sabouraud agar with salts diluted (1/10) (Takashio, 1972), *Guizotia abyssinica* 0.75% + salts agar (Takashio and De Vroey, 1976) and soil + keratin (Vanbreuseghem, 1952). Horse hair mixed with feathers were the source of keratin. Inocula were placed in Petri dishes on the first two media one cm apart. Conidial suspensions of paired strains in sterile water were added to the "soil + keratin" media. Petri dishes were incubated at 25°C for 4-7 weeks. All tests were done in triplicate. In a preliminary test, strains were grown singly, to discard the possibility of self-fertility.

RESULTS AND DISCUSSION

The most satisfactory results were obtained on soil + keratin media, which yielded ascomata within 1-2 weeks. Pairing of both mating types on other media failed.

Of the 20 isolates paired with tester strains of ***C. serratus***, 18 produced fertile ascomata (Figs. 2-5). Of these 11 were of type (+) and 7 of type (-). Two isolates which appeared slightly degenerate (with clusters of sterile mycelium) gave negative results (Table I). The three strains previously identified as ***C. asperatum***, including the type strain, were fertile. All three are of the (-) mating type.

Conidia of all strains studied had similar dimensions (Table I). Frey & Griffin (1961) had reported 8.3 - 16.4 x 6 - 12.9 µm for ***C. serratus***. Carmichael indicates similar dimensions for ***C. serratus*** (10 - 17 x 7 - 9 µm, mostly 12 x 8 µm) and somewhat smaller for ***Chrysosporium asperatum*** (9 - 11 x 6.5 - 9.5µm, mostly 11 x 8 µm). Furthermore, van Oorschot (1980) assigns great taxonomic value to conidial dimensions for separating both species, with a maximum for ***M.*** anamorph of ***C. serratus*** of 23 µm in length, and for ***M. vellerea*** of 13 µm in length. In our studies we obtained a mean for all isolates of 10.59 x 7.28 µm, without deviations large enough to warrant separation into two species. Conidiogenous structures were also very similar in all strains studied (Figs. 1,6,7).

Colony colour has also been regarded as important for distinguishing both species. Carmichael recorded brown to olive colonies for ***C. asperatum*** and buff colonies for ***M.*** anamorph of ***C. serratus***, when both were grown on cellophane on PYE agar. Van Oorschot recorded darker brown colonies for ***C. serratus*** . In our studies (Table II) colony pigmentation was highly variable, ranging normally between olivaceous and buff after two weeks growth, but there were significant differences even between subcultures of the same strain, on the same medium. However, after 4 weeks growth all strains appeared uniformly dark buff to brown. Colony growth rates (see Table II) were also similar: on PYE colony diameters after two weeks ranged from 34 - 49 mm; on PDA, 35 - 55 mm and on Czapek agar, 10 - 35 mm.

We therefore suggest that both species are the anamorph of ***C. serratus*** and propose the following nomenclator, adapted from van Oorschot (1980):

Myceliophthora vellerea (Sacc. & Speg.) van Oorschot. Stud. Mycol. 20: 47 (1980)
≡ ***Sporotrichum vellereum*** Sacc. & Speg. Michelia 2: 287 (1882)
= ***Chrysosporium asperatum*** Carmichael. Can. J. Bot. 40: 1153 (1962)
= ***Chrysosporium serratum*** (Eidam) Dominik. Zesz. nauk. wyzsz. Szk. roln. Szczec. 24: 59 (1967)
= ***Sporotrichum ochrokeratinophilum*** Matsushima. Icones Microf. a Mats. lect., p 143 (1975)

TABLE I.- MATING TYPES AND CONIDIA SIZE OF THE STRAINS STUDIED.

Strain	Mating type	Mean*	Range	
FMR 701	+	10.58±1.00 x 7.68±1.19	8.0 - 13.0	5.0 - 10.0
FMR 702	-	10.66±1.04 x 7.03±0.93	9.0 - 14.0	5.0 - 9.0
FMR 703	+	10.94±1.65 x 7.35±0.99	8.0 - 20.0	5.2 - 10.0
FMR 704	+	11.32±1.16 x 7.57±0.83	8.0 - 14.5	5.5 - 9.0
FMR 705	-	10.93±1.46 x 6.94±0.69	8.5 - 15.0	5.0 - 9.0
UAMH 564 (1)	-	10.38±1.03 x 7.27±0.96	8.0 - 14.0	5.0 - 9.5
UAMH 3173 (1)	-	10.37±0.80 x 6.84±0.85	8.5 - 14.0	5.2 - 9.2
UAMH 3090 (2)	+	10.32±0.81 x 7.20±0.92	8.0 - 14.2	5.0 - 9.0
UAMH 3197 (2)	-	10.09±0.77 x 6.97±0.88	8.0 - 14.5	5.0 - 9.2
FMR 706	+	11.17±1.21 x 7.18±0.97	8.5 - 14.0	5.0 - 9.7
FMR 707	-	9.66±0.98 x 6.97±0.95	8.0 - 13.0	4.0 - 8.7
FMR 708	+	12.26±1.69 x 6.95±0.95	8.2 - 17.0	4.5 - 9.0
FMR 709	+	10.53±1.30 x 7.59±1.07	8.0 - 16.0	5.0 - 9.0
FMR 710	+	10.59±1.19 x 7.39±1.07	8.0 - 15.0	5.0 - 10.0
FMR 711	+	10.39±0.87 x 7.47±0.96	8.5 - 13.0	5.0 - 9.5
FMR 712	+	10.63±1.12 x 7.65±0.93	8.7 - 15.0	5.5 - 9.5
FMR 713	+	10.31±1.10 x 7.45±1.16	8.5 - 14.0	5.0 - 9.5
FMR 700	?	10.64±1.08 x 6.68±1.17	8.0 - 14.0	5.0 - 9.5
FMR 714	-	10.20±0.96 x 7.72±0.86	8.0 - 13.0	6.0 - 10.0
FMR 715	+	10.48±1.10 x 7.45±0.98	8.0 - 15.0	4.5 - 9.0
FMR 716	?	10.32±1.17 x 7.58±0.85	8.0 - 15.0	5.0 - 9.5
CBS 169.62 (1)	-	10.19±0.91 x 7.25±1.12	8.0 - 13.0	4.5 - 9.0

Total mean: 10.59 x 7.28

* Mean ± standard deviation (length x width) in µm of 100 random conidia.
? Degenerate cultures.
(1) Strains previously identified as *M. vellerea*
(2) Strains previously identified as *M.* anamorph of *Ctenomyces serratus*

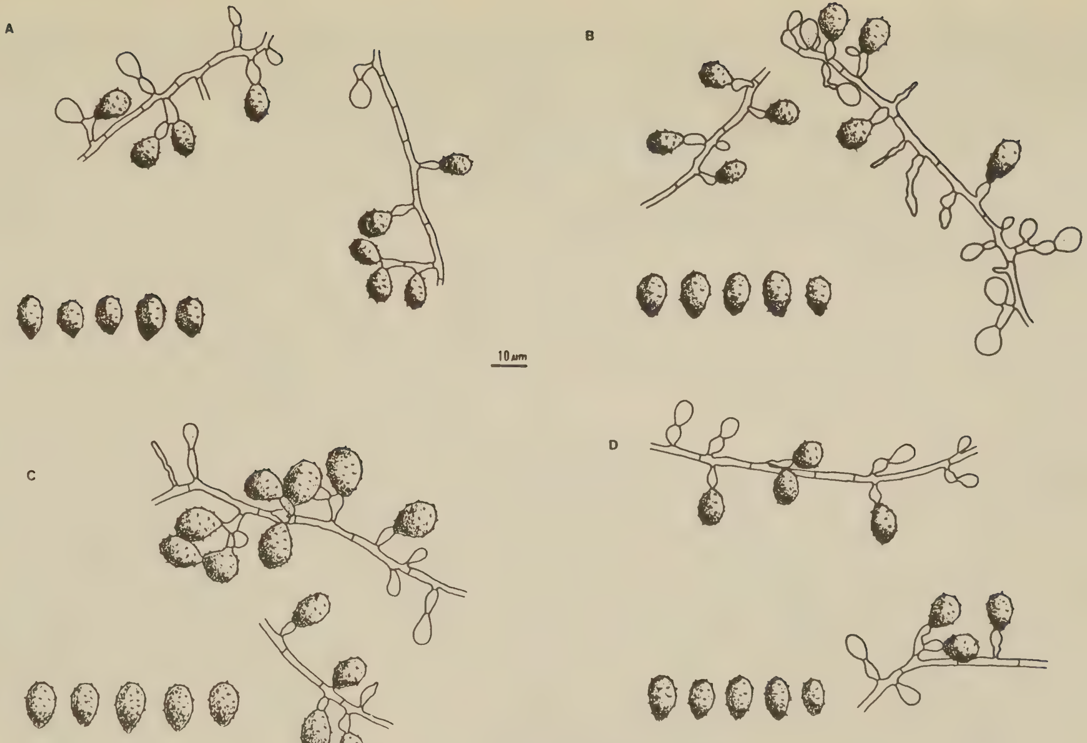


Fig. 1.- Myceliophthora vellerea. A, CBS 1692.62. B, UAMH 564. C, UAMH 3090. D, UAMH 3197.

TABLE II.- DIAMETER AND COLOUR OF THE COLONIES OF THE STRAINS STUDIED

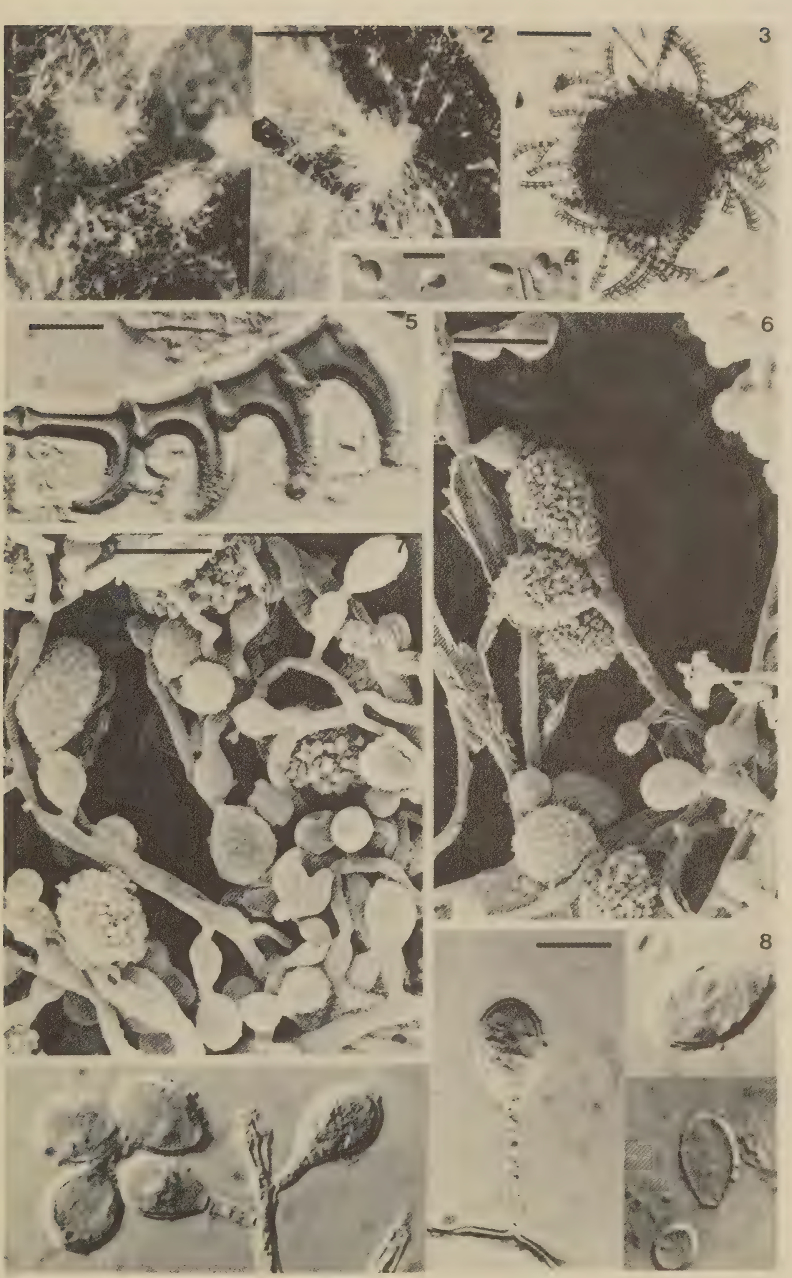
Strain	Colony diameter (mm) on: PYE	Czapek	PDA	Colony colour*
FMR 701	38	19	48	Honey 19´´ b
FMR 702	44	25	48	Buff/Greenish-olivaceous
FMR 703	40	25	47	Buff 19´´ f
FMR 704	49	12	47	Buff 21´´ d
FMR 705	40	10	49	Olivaceous-Buff 19´´´´ b
UAMH 564	38	12	44	Greenish Olivaceous 21´´´
UAMH 3173	41	28	45	Buff-Honey 21´´ d
UAMH 3090	38	25	50	Buff 19´´ d
UAMH 3197	40	35	49	Honey 19´´ d
FMR 706	35	16	35	Olivaceous-Buff 21´´´ b
FMR 707	34	35	49	Buff 19´´ d
FMR 708	38	29	48	Olivaceous-Buff 21´´´´ b
FMR 709	44	30	41	Olivaceous-Buff 21´´´ f
FMR 710	38	28	40	Olivaceous-Buff 23´´´´ b
FMR 711	39	11	36	Honey 19´´ b
FMR 712	40	27	42	Buff 19´´ d
FMR 713	35	30	39	Olivaceous-Buff 23´´´´ b
FMR 700	42	35	55	Buff 19´´ d
FMR 714	34	25	38	Grey-Olivaceous 21´´´´ b
FMR 715	44	24	40	Honey 19´´ b
FMR 716	43	25	47	Olivaceous-Buff 23´´´´ b
CBS 169.62	45	18	47	Greenish-Olivaceous 21´´´´b

* Rayner, R. W. (1970).- A mycological colour chart. Commonwealth Mycological Institute, Kew, Surrey, U. K.

Figs. 2-8.- *Ctenomyces serratus*. 2, Ascomata on hair under the stereomicroscope (UAMH 3090 x UAMH 564). 3, Ascoma (UAMH 3090 x 3197), LM. 4, Ascospores (UAMH 3090 x UAMH 3173), DIC. 5 Ascomatal appendage (UAMH 3090 x UAMH 3173), DIC. 6, Conidiogenous cells and conidia (UAMH 3197), SEM. 7, Conidiogenous cells and conidia (UAMH 564), SEM.

- *Chrysosporium* anamorph of *Arthroderma tuberculatum*. 8, conidia (FFBA 216), DIC.

- Bar = (2, 500 um; 3, 100 um; 4, 5 um; 5, 10 um; 6, 10 um; 7, 10 um; 8, 10 um)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Teleomorph: *Ctenomyces serratus* Eidam in Cohn., Beitr. Biol. Pfl. 3: 274 (1880)

Other congeneric species, or in closely related genera, with verrucose conidia are: *C.* anamorph of *Renispora flavissima* Sigler et al., *Histoplasma* spp., *C.* anamorph of *Arthroderma multifidum* Dawson, *C.* anamorph of *Arthroderma tuberculatum* Dawson, *Myceliophthora thermophila* (Apinis) v. Oorschot, *M. hinnulea* Awao & Udagawa and *M.* anamorph of *Corynascus sepedonium* (Emmons) v. Arx. The above clearly differ from *M. vellerea* , apart from colony colour, in the following characters: the first four lack ampulliform conidiogenous cells, *M. thermophila* and *M. hinnulea* have much smaller conidia and *M.* anamorph of *Corynascus sepedonium* produces globose conidia. *Zymonema* (*Blastomyces*) *dermatitidis* (Gilchrist & Stokes) Dodge may also produce tuberculate conidia (Vermeil et al., 1982) but this is rare (van Oorschot, 1980), and its conidia are much smaller and with other outstanding characters, such as its dimorphism, its lack of keratinolytic power and its pathogenicity on humans.

Van Oorschot (1980) also includes *C.* anamorph of *Arthroderma tuberculatum* in *Myceliophthora.* However, we recently had the chance to examine a soilborne isolate of this species (FFBA 216) (Fig. 8) and it agrees with the descriptions by Carmichael (1962) and Padhye & Carmichael (1971). Swollen conidiogenous cells were not observed, and we thus prefer to retain the species in *Chrysosporium*.

We also disagree with van Oorschot on *C.* anamorph of *A. multifidum* , who excludes it from *Chrysosporium* on the grounds of conidial septation and suggests that the above is intermediate between *Microsporum* and *Trichophyton*. We have examined 3 recent isolates of this species (FFBA 340, FFBA 341 & FFBA 342) and we have only detected 0 - 1 septate conidia. The colonies were lemon-yellow, and ampulliform swellings were not seen either, all of which match the description by Padhye & Carmichael (1971). We therefore choose to retain the above species in *Chrysosporium*.

We find it rather difficult to separate *Chrysosporium* from *Myceliophthora* on the basis of blastic or thallic conidia, as done by van Oorschot (1980). Furthermore, her monograph includes species with intermediate characters: e.g. *C. indicum* and *C. pannicola* develop conidia on ampulliform swellings (typical of *Myceliophthora*). Probably all pleurogenous conidia, as well as those arising from ampulliform conidiogenous cells are blastic. However, we find it more difficult to recognize the type of ontogeny of acrogenous conidia. Furthermore, Carmichael (1971) detected both arthroconidia (=thallic) and blastoconidia in one and the same species, *C. merdarium.* An important character which does seem to differentiate most species grouped by van Oorschot under *Myceliophthora*, as opposed to *Chrysosporium*, is the presence of the above-mentioned swollen conidiogenous cells. As suggested by Sigler (pers. comm.), if this character is constant, it may be useful for separating both genera.

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HYPOXYLON DURANII SP. NOV. AND THE ANAMORPHS OF H. CARIES, H. PAPILLATUM, AND ROSELLINIA SUBICULATA

Jack D. Rogers

Department of Plant Pathology
Washington State University
Pullman, WA 99164-6430

SUMMARY

Hypoxylon duranii sp. nov. is described from wood collected on Yucatan Peninsula, Mexico. Ascospores are ornamented with transversely oriented ribs. The *Nodulisporium* anamorph of *Hypoxylon papillatum* and the *Geniculosporium* anamorph of *Hypoxylon caries* are described from culture. The anamorph of *Rosellinia subiculata*, described from culture, has features of both *Nodulisporium* and *Geniculosporium*.

A collection of a new *Hypoxylon* species was made by Rubén Durán in Mexico and given to me for study. It is a pleasure to name this fungus in honor of my distinguished colleague and friend.

Hypoxylon duranii J. D. Rogers, sp. nov.

Stromata pulvinata vel irregularia, saepe confluentia, 1-5 mm X 1-5 mm X 1-2 mm crassa, ferruginea vel purpurea, demum atra; intus atra. Superficies levis vel asperula, peritheciis elevatis. Ostiola umbilicata, inconspicua. Textura stromatum lignea vel leviter carbonacea.

Perithecia 0.2-0.3 mm diam. Asci octospori, cylindrici, longe stipitati, 130-140 µm longitudine tota X 8-10 µm crassi, partes sporiferae 80-90 µm longitudine, annulo apicali in liquore iodata Melzeri immerso cyanescente, placentiformi, 0.3-0.5 µm alto X 3 µm crasso. Ascosporae brunneae, unicellulares, ellipsoideo-inaequilaterales, sub microscopio luminoso observatae specie leves vel indistincte transverse striatae, sub microscopio electronico scrutante simulacrum dantes ornamentorum parallelorum vel anastomosantium funiculiformium in spora transverse positorum, 11-13 X 4.5-6 μm, rima germinativa longa praeditae.

Stromata pulvinate to irregular, often confluent (Figs. 1,2), 1-5 mm X 1-5 mm X 1-2 mm thick, rusty to purplish red, becoming black with age; interior black. Surface of stromata smooth or slightly roughened by perithecial elevations. Ostioles umbilicate, inconspicuous. Stromata woody to slightly carbonaceous.

Perithecia 0.2-0.3 mm diam. Asci 8-spored, cylindrical, long-stipitate, 130-140 μm total length X 8-10 μm broad, the spore-bearing parts 80-90 μm long, with the apical ring bluing in Melzer's iodine reagent, plate-like, 0.3-0.5 μm high X 3 μm broad. Ascospores brown, one-celled, ellipsoid-inequilateral, appearing smooth or indistinctly transversely striate by light microscopy (Figs. 3,4), seen to be adorned with parallel to anastomosing rope-shaped ornaments oriented perpendicular to the long axis of the spore by scanning electron microscopy (Fig. 5), 11-13 X 4.5-6 μm, with straight germ slit spore-length.

Mexico: Durán, R., XI.1984, on grounds of Chickén Itzá ruins, near highway 180 near Piste, Yucatan Peninsula, Yucatan, Mexico, on wood of leguminous tree on ground (WSP 67597, HOLOTYPE; J. D. Rogers herb., ISOTYPE).

Colonies on 2% potato dextrose agar with 5 g/l yeast extract covering Petri plates in 3 wk, with mycelium at first appressed, becoming tomentose or lanose; initially

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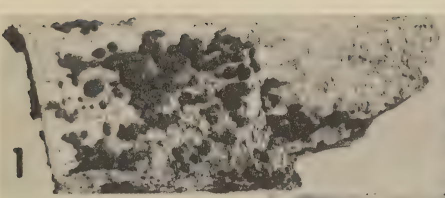
Figs. 1-10. *Hypoxylon duranii*, *H. papillatum*, *H. caries*. Figs. 1-5. *H. duranii*. Fig. 1. Stromata on bark, X 0.8. Fig. 2. Several stromata from Fig. 1 showing perithecial contours, X 6. Fig. 3. Ascospores, X 2060. Fig. 4. Ascospore showing germ slit and transversely oriented ribs (arrows), X 3400. Fig. 5. Ascospore showing ornamentation, X 7000. Figs. 6-9. *H. papillatum*. Fig. 6. Conidiogenous cells showing conidial secession scars (arrow), X 1650. Figs. 7,8. Portions of conidiophores and conidiogenous cells showing branching habit, X 1250. Fig. 9. Conidia, X 1250. Fig. 10. *Hypoxylon caries*. Conidia, X 1650.

Figs. 1 and 2 by photomacrography. Figs. 3 and 4 from water mounts by brightfield microscopy. Figs. 6-10 from mounts on Double Stick Scotch brand tape in lactophenol by differential interference microscopy. Fig. 5 by scanning electron microscopy.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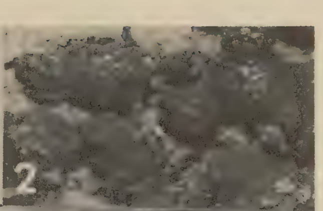
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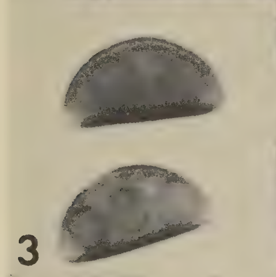
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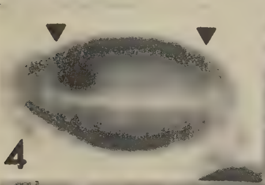
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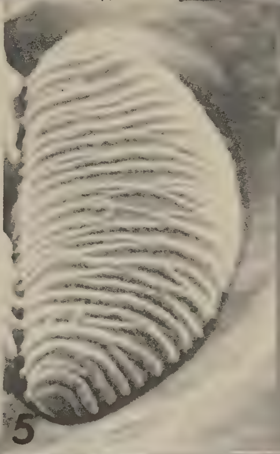
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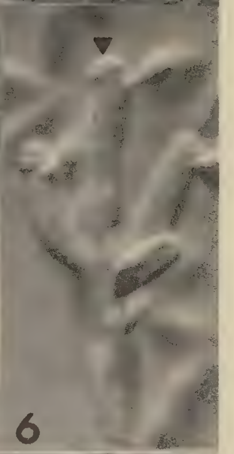
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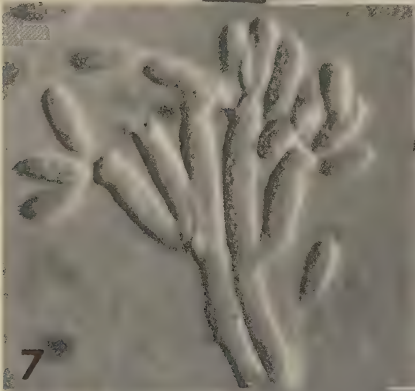
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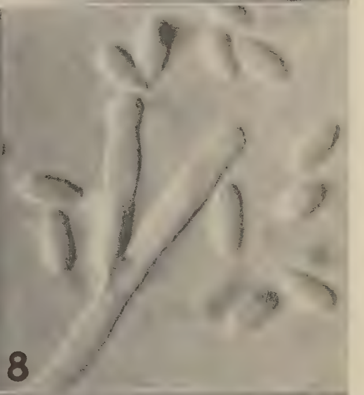
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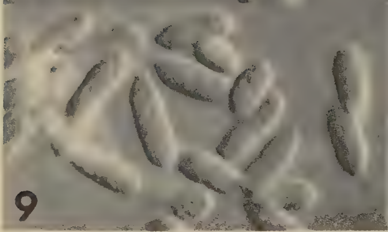
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light gray, becoming dark gray with concentric zones or irregular patches of rusty red. Reverse at first yellow, becoming deep blackish brown. Cultures with pungent odor reminiscent of smoked almonds or kippers.

By light microscopy, surface of colony with bramble-like aggregations of grotesquely branched hyphae.

No anamorph observed. Dried cultures deposited with holotypic material.

Hypoxylon duranii seems closely related to *H. gillesii* J. D. Rogers & F. Candoussau, the only other described species with ascospores conspicuously ornamented with transversely oriented ribs (8). These species likewise are similar in the rusty red color of mature stromata, the umbilicate ostioles, and the absence of conidia in culture. They differ in the sizes of ascospores, in cultural characters, and in the habit of stromata.

Ascospores of some other members of section Hypoxylon of *Hypoxylon* (6) show transversely oriented fibrils in the perispore (outer ascospore wall), but these are seen only by scanning electron microscopy. The walls of such ascospores -- exemplified by *H. rubiginosum* (Pers. : Fr.) Fr. (7) and *H. vogesiacum* Pers. : Sacc. (unpublished) -- are considered to be smooth. The presence of more or less conspicuous transversely oriented perispore elements might eventually be shown to be of taxonomic importance in subdividing *Hypoxylon*.

Hypoxylon papillatum Ellis & Everh. Cultures and anamorph.

Colonies on 2% potato dextrose agar with 5 g/l yeast extract covering Petri plates in 3 wk, with mycelium appressed to somewhat lanose, at first tawny, becoming tan to brownish. Reverse at first yellowish, becoming dark mahogany to blackish. Conidiophores produced abundantly on all parts of colony.

Conidiophores upright, asymmetrically branched at several ranks or sometimes verticillately branched, subhyaline, smooth or minutely roughened (Figs. 6-8), 100 µm or longer X 3-7 µm. *Conidiogenous regions* apical, becoming swollen from conidial production in limited areas, bearing conspicuous crater-shaped conidial secession scars (Figs. 6-8). Conidia produced holoblastically. *Conidia* hyaline, smooth, obovoid or somewhat rectangular, with flattened bases indicating former points of attachment to conidiogenous cell (Figs. 7-9), 7-10(-12) X (2-)2.5-3.5 µm.

Specimen from which cultures were initiated: USA: Rogers, J. D., VIII.1983, Bruce's Chapel, Mason Co., West Virginia, on ?*Acer* (J. D. Rogers herb.). Dried culture deposited with teleomorphic material.

Hypoxylon papillatum apparently is infrequently collected. The specimen cited here represents my first collection and herbaria contain relatively few collections. The anamorph is a typical *Nodulisporium* Preuss with robust conidiophores and swollen *conidiogenous* areas of the general type usually associated with other members of section Hypoxylon of *Hypoxylon* (6).

Hypoxylon caries (Schw.) Sacc. Cultures and anamorph.

Colonies on 2% potato dextrose agar with 5 g/l yeast extract covering Petri plate in 4 wk, with mycelium appressed, thin or with conspicuous thickened regions which probably represent stromata, tan to gray in areas of conidial production. Reverse yellowish. Conidia produced on various parts of plate, but produced more abundantly on Bonar's modification of Leonian's medium (see 1), Difco Corn Meal-Dextrose agar, or SME medium (see 3).

Conidiophores upright or prostrate, usually symmetrically or verticillately branched at several ranks, hyaline, smooth, 100 μm or much longer X 2-4 μm. *Conidiogenous regions* apical or occasionally intercalary, geniculate, with conspicuous crater-shaped conidial secession scars (Figs. 11,12). Conidia produced holoblastically. *Conidia* hyaline, smooth, obovoid to lacrymoid or nearly globose, with flattened bases indicating former points of attachment to conidiogenous cell (Figs. 10-12), 3.5-5(-6.5) X 2-4 μm.

Specimen from which culture was initiated: USA: Rogers, J. D., 23.X.1984, Dixon Springs, Pope Co., Illinois, on decayed wood (J. D. Rogers herb). Dried culture deposited with teleomorphic material.

The anamorph of *H. caries* is a typical *Geniculosporium* Chesters & Greenhalgh, greatly resembling the *Geniculosporium* state of *H. serpens* (Pers. : Fr.) Kickx (2). The close relationship of *H. caries* and *H. serpens* is undoubted and, indeed, Martin (4) considered them conspecific. For the present, I consider these taxa to be distinct species, primarily on the more or less oblong ascospores of *H. caries*.

Rosellinia subiculata (Schw. : Fr.) Sacc. Cultures and anamorph.

Colonies on 2% potato dextrose agar with 5 g/l yeast extract covering Petri plate in 6-8 wk, with mycelium appressed, pure white with yellow exudation, in narrow concentric rings. Reverse orange brown. *Colonies* on oatmeal agar similar, but with purplish reverse. *Colonies* on SME (see 3) with alternating white and yellow zones. Reverse light yellow. Conidia produced infrequently on above media. *Colonies* on 2% cornmeal agar growing very restrictedly, white, appressed, producing abundant conidia.

Conidiophores upright or prostrate, asymmetrically branched at several ranks, hyaline, smooth, 120 µm long or, sometimes, much longer X 2-3 µm. *Conidiogenous regions* apical or intercalary, often very long, frequently interrupted by long nonconidiogenous regions, conspicuously geniculate or without obvious geniculations (Figs. 13-16), bearing conspicuous crater-like condial secession scars. Conidia produced holoblastically. *Conidia* hyaline, smooth, obovoid to ellipsoid, with flattened bases indicating former points of attachment to conidiogenous cell (Figs. 13-16), 3-4 X 2-2.5 µm.

Specimen from which cultures were initiated: USA: Rogers, J. D., 24.X.1984., La Rue Swamp, Union Co., Illinois, on decayed wood (J. D. Rogers herb.). Dried cultures deposited with teleomorphic material.

The anamorph of *R. subiculata* is not easily placed in a hyphomycetous genus. In some cases conidiogenous areas are highly geniculate in the manner of *Geniculosporium*.

Figs. 11-16. *Hypoxylon caries*, *Rosellinia subiculata*. Figs. 11-12. *Hypoxylon caries*. Geniculate conidiogenous regions, conidial secession scars most prominent in Fig. 12 (arrow), X 1650. Figs. 13-16. *Rosellinia subiculata*. Conidiogenous regions. Highly geniculated regions seen in Figs. 13, 16. More or less nongeniculated regions seen in Figs. 13, 14, 15. Arrows in Figs. 13 and 15 indicate intercalary conidiogenous regions separated from other conidiogenous regions by vegetative portions, X 1250.

All mounts on Double Stick Scotch brand tape. Figs. 11 and 12 from water mounts by differential interference microscopy. Figs. 13-16 from lactophenol mounts by darkfield phase microscopy.

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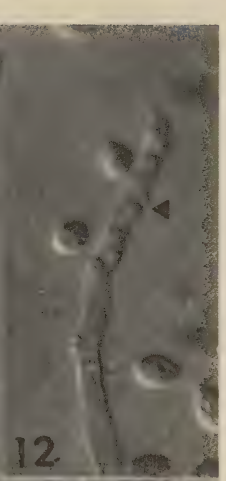

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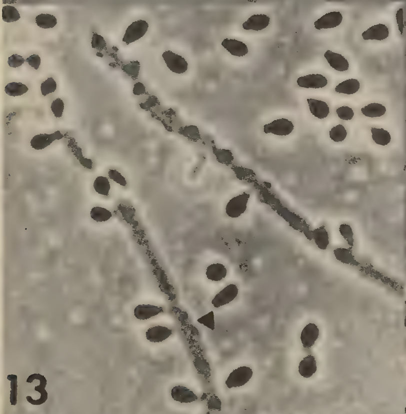

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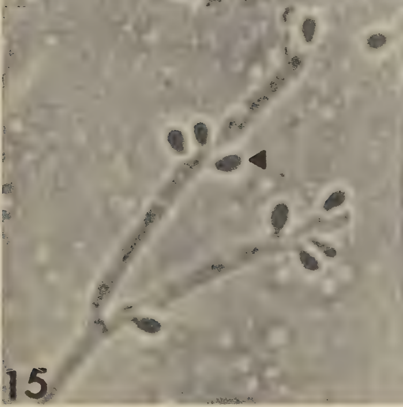

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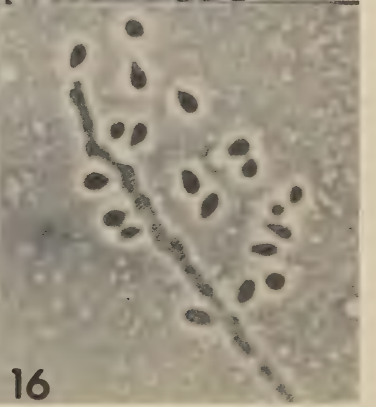

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In other instances conidiogenous areas are somewhat inflated or at least not conspicuously geniculated. Conidial production is terminal and intercalary, conidiogenous regions often separated by long vegetative regions.

Martin (5) considered *R. subiculata* to be synonymous with *H. chrysoconium* Berk. & Br. Miller (6) apparently considered these species to be distinct. In my experience, the subiculum of *R. subiculata* is sulfur yellow whereas the subiculum of *H. chrysoconium* is orange. For the present, I consider these strongly related taxa to be separate species.

Martin (5) described a culture of *H. chrysoconium*, but did not indicate the source of the culture. His brief descriptions of culture color and morphology and of conidiophores is largely in agreement with mine.

ACKNOWLEDGMENTS

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A NEW SPECIES OF HYPOCHNICIUM (CORTICIACEAE) FROM ARGENTINA[1]

SILVIA E. LOPEZ and JORGE E. WRIGHT[2]

Departamento de Ciencias Biológicas
Facultad de Ciencias Exactas y Naturales
Universidad de Buenos Aires
1428 Buenos Aires, Argentina

SUMMARY

A new species of Corticiaceae is described, viz. *Hypochnicium gomezii* collected on stumps of *Eucalyptus viminalis* in the NE of the province of Buenos Aires, Argentina.

INTRODUCTION

During a survey of the wood-inhabiting fungi of *Eucalyptus viminalis* in the NE of the province of Buenos Aires, a corticiaceous fungus was found which does not agree with any published description and is therefore proposed here as new.

DESCRIPTION OF SPECIES

HYPOCHNICIUM GOMEZII nov. sp.

Basidiocarpo resupinato, hypochnoide, laeve aut dentibus penicillatis sub lente, albo in juventute, demum cremeo luteo. Systema hypharum monomiticus, hyphis fibulatis 3-6 um diam., crassitunicatis; subiculo laxo; subhymenio denso. Lamprocystidiis longis, subulatis, praecipue in dentibus, 100-200 x 5-11 um, incrustatis. Basidiis longis, subcylindricis vel subclaviformibus, 4-sporis 32-45 x 6-8 um, cum fibula basali. Sporis subglobosis vel late ellipsoideis,

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[2] Principal Researcher of the above Consejo.

6-9 x 5,5-6,5 um, apiculatis, crassetunicatis, laevis, metachromaticis cum "Cresyl blue", inamyloideis, hyalinis.

Holotypus: Argentina, Buenos Aires, Gdor. Castro, leg. Lopez, Romero & Cabral, V/1982, ad partem amputatum truncibus Eucalypti viminali. in Herb. BAFC 30096 conservatus est. Haec species ad cl. beato Carlos E. Gomez dedicata est.

Basidiocarp resupinate, hypochnoid, easily peeling off the substrate, smooth or with isolated teeth which may be confluent and appear penicillate under the lens; margin indefinite and arachnoid concolorous; surface porose-reticulate. White when young, becoming yellowish cream upon aging. Hyphal system monomitic, with clamped hyphae, 3-6 um diam., thick-walled (fig. 1c); irregularly interwoven in the subiculum, becoming thinner and perpendicular to the substrate and forming a dense subhymenium (fig. 1a). Cystidia long and subulate to cylindric lamprocystidia, 100-200 x 5-10 um, sometimes septate (fig. 1d), with crystalline incrustations almost all their length and irregularly distributed (fig. 1e), concentrated at the teeth and projecting above the hymenium. In smooth zones there appear also hyphal ends which are septate and clamped, projecting above the hymenium. Basidia long, subcylindric to subclaviform (fig. 1b), with median constriction, 32-45 x 6-8 um, provided with a basal clamp and 4 sterigmata, guttulate. Basidiospores subglobose to broadly elliptic, 6-9 x 5,5-6,5 um, guttulate, with a notorious apiculum, walls thick and smooth, metachromatic in Cresyl blue (figs. 1f, 2c).

Material studied: the holotype. Argentina, Buenos Aires, Ezeiza, leg. Wright VI/1968, on fallen branch in woods of Eucalyptus (BAFC 30093); Pereyra Iraola, leg. Gomez, VI/1979, on stump of unidentified conifer (BAFC 30094); Gdor. Castro, leg. Lopez, Romero & Cabral, IX/1981, on stump of E. viminalis (BAFC 30097); ibid., leg. Lopez, Romero & Cabral, II/1982 (BAFC 30095).

Remarks: The nature of the spores is the deciding feature of the genus. Eriksson (1958) underlies the thickness of the walls and Boidin and Lanquetin (1971) add the metachromatic reaction with Cresyl blue. Both characters, together with the structure of the basidiocarp place this species in the genus Hypochnicium.

The spores are similar, but more elliptic than tho-

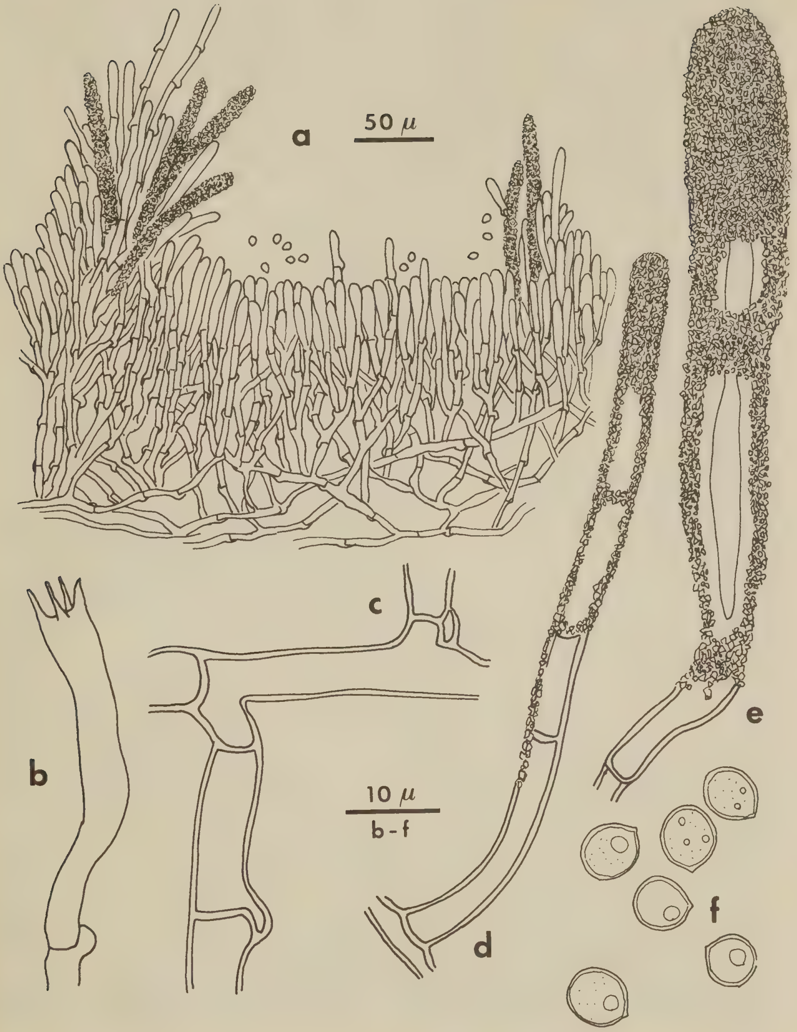
a
50 μ
b
c
10 μ
b-f
d
e
f

Figura 1. Hypochnicium gomezii. a: cross section through the fruitbody; b:basidium; c: detail of hyphae from the subiculum; e,d: cystidia; f: spores.

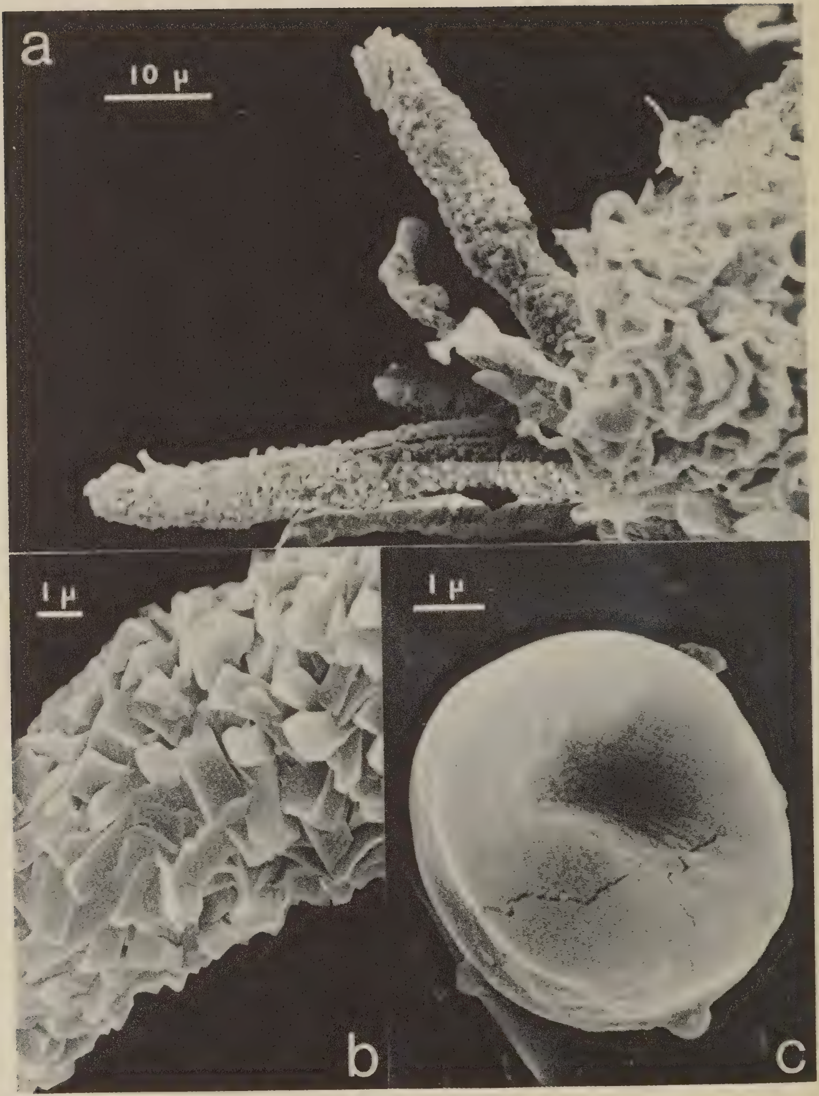

Figura 2. Hypochnicium gomezii. Scanning electron micrographs. a: Tooth apex with cystidia; b: detail of crystals; c: spore.

se of H. sphaerosporum in which on the other hand, no incrusted cystidia were observed. Their presence points out to relationships with H. polonense, although they do not exhibit neither septa nor clamps. Thus, we consider H. gomezii within the H.-polonense group in the subdivision of the genus proposed by Eriksson and Ryvarden (1976). We have found some similarities with H. longicystidiosum (Rattan) Hjortstam, although the size of spores and basidia, and the cystidia incrustation are different (fig.2ab). Hjortstam (Hjortstam and Ryvarden, 1984) have placed the latter in the Sphaerosporum-group, and after seeing our collections, he has agreed that both are different taxa.

This species had been previously observed in Argentina by the late Carlos E. Gomez (MS) to whom it is dedicated as a hommage to his pioneering work on corticiaceous fungi in Argentina.

ACKNOWLEDGEMENTS

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THE ANAMORPH GENUS ZALERION

R. D. GOOS

Department of Botany
University of Rhode Island
Kingston, RI 02881

SUMMARY

The history of the genus Zalerion is briefly reviewed and standardized descriptions of the four recognized species are given. A key to species is also provided.

The genus Zalerion was erected by Moore and Meyers (1962) to include members of the Hyphomycetes producing conidia having irregular spirals in three dimensions. Moore and Meyers described four species; Z. nepura (type), Z. eistla, Z. xylestrix and Z. raptor. These species were differentiated on the basis of gross colony characteristics, pigment production, and cellulolytic ability. All four species were obtained from marine habitats. Two species described by Linder (Barghoorn and Linder, 1944) from marine habitats, Helicoma maritimum Linder and Helicoma salinum Linder, were considered by Meyers and Moore as species dubia. Anastasiou (1963), in a review of the genus Zalerion, considered Helicoma maritimum a valid species, citing it as the type species of the genus Zalerion, and treating the four species described by Moore and Meyers as synonyms of the new combination, Zalerion maritimum (Linder) Anastasiou. Anastasiou's view has been accepted by subsequent workers (Ellis, 1976; Kohlmeyer & Kohlmeyer, 1979), and Zalerion is now considered a valid genus.

Zalerion was originally described as a genus of marine fungi; as with Cirrenalia, however, terrestrial fungi have been assigned to the genus. As presently constituted, the genus contains two marine and two terrestrial species. Z. arboricola Buczacki was isolated from stem cankers of conifers; Z. sachidanandii Reddy et. al., the other terrestrial species, was found on decaying stems of coconut.

Kohlmeyer and Kohlmeyer (1979) have reviewed current knowledge of the marine species, and Ellis (1976) included Z. arboricola and Z. maritimum in his treatment of dematiaceous Hyphomycetes. This review provides a key and descriptions of the four currently recognized species. This review is not intended as a taxonomic revision, but rather as a summation of the present state of the genus, based upon current literature.

ZALERION Moore and Meyers. Canad. Jour. Microbiol. 8:408. 1963.
TYPE SPECIES: *Zalerion maritimum* (Linder) Anastasiou.
(Basionym: *Zalerion nepura* Moore and Meyers. 1962).

Colonies effuse, mostly dark greyish-olive or olivaceous brown, velvety. *Mycelium* superficial and immersed. *Conidiophores* micronematous or semimacronematous, loosely branched or unbranched, straight or flexuous, colorless or brown, smooth or verruculose. *Conidiogenous* cells monoblastic, integrated, almost always terminal, cylindrical, doliiform or clavate. *Conidia* solitary, helicoid; *filament* sometimes branced, multiseptate, constricted at the septa, mid to dark brown, smooth or verruculose, coiled irregularly, often in several planes, and sometimes forming a knot or ball of cells.

1. *Zalerion arboricola* Buczacki. Trans. Brit. Mycol. Soc. 59:159-161. 1972. (Fig. 1).

Colonies on 3% malt agar reaching 2.0 cm diam. in 14 days at 22.5 C; pale olivaceous to dark olivaceous-buff. *Mycelium* composed of branched, septate hyphae, often minutely verruculose. *Conidophores* micronematous or lacking, pale to mid-brown. Conidia arising blastogenously from the assimilative hyphae, or terminally on short, lateral conidiophores. *Conidial filament* mostly of 2-7 cells, constricted at the septa, individual cells more or less isodiametric, mid to dark brown, often verruculose; 4-7 µm in diam.; coiled conidium 10-20 µm in diam.

SUBSTRATE: Isolated from cankers of *Larix decidua* Mill. caused by *Trichoscyphella willkommii* (Hart). Nannf. and from stem wounds of *Picea abies* Karst.

DISTRIBUTION: Great Britain

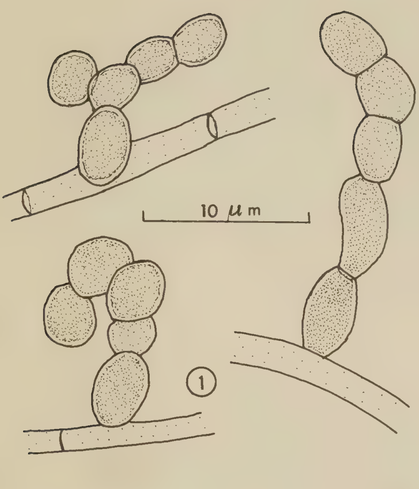
2. *Zalerion maritimum* (Linder) Anastasiou. Canad. Jour. Bot. 41: 1126. 1963. (as *Z. maritima*) (Fig. 2.).

≡ *Helicoma maritima* Linder, 1944.
= *Helicoma salinum* Linder, 1944.
= *Zalerion nepura* Moore and Meyers, 1962.
= *Zalerion eistla* Moore and Meyers, 1962.
= *Zalerion xylestrix* Moore and Meyers, 1962.
= *Zalerion raptor* Moore and Meyers, 1962.

Marine fungus. *Colonies*, in culture, soon becoming dark; mycelium composed of branched, septate, hyaline to fuscous hyphae, 2-4 µm in diameter. *Conidiophores* 10-115 µm long, 3-5.5 µm in diameter, micronematous or semimacronematous, simple or rarely branched, light to dark fuscous. *Conidia* acrogenous, solitary, blastic; *conidial filament* 4-30 septate, slightly or strongly constricted at the septa, fuscous to almost black; 4-12 µm in diam., coiled 1-5 times, to form a conidium 19-50 µm in diam.

SUBSTRATE: Wood and other cellulosic substrates submerged in sea water.

DISTRIBUTION: World-wide. (Kohlmeyer & Kohlmeyer, 1979).



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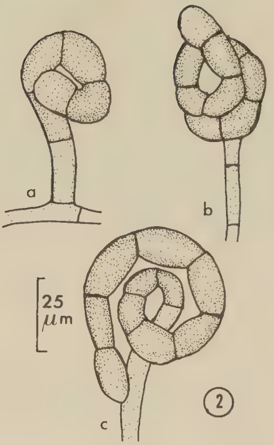

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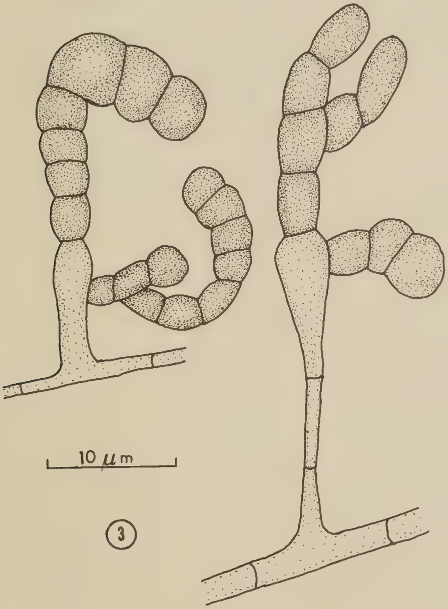

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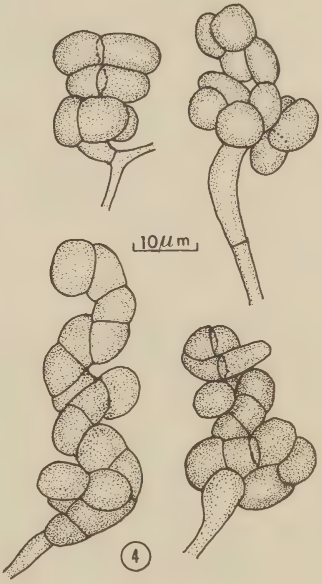

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Legend to Figures: Fig. 1. Zalerion arboricola. (Redrawn from Buczacki, 1972). Fig. 2. Zalerion maritimum (a and b redrawn from Ellis, 1976c; c. redrawn from Kohlmeyer and Kohlmeyer, 1979, [Fig. 116]). Fig. 3. Zalerion sachidanandii (redrawn from Reddy et al., 1980). Fig. 4. Zalerion varium (redrawn from Anastasiou, 1963).

3. Zalerion sachidanandii S. R. Reddy, S. S. Reddy and S. M. Reddy. Indian Phytopath. 33:73. 1980. (Fig. 3).

Colonies irregular, deep to dirty-brown; mycelium immersed and superficial, composed of branched, septate hyphae, 1.5-2.5 µm in diam., sometimes forming mycelial strands. Conidiophores single, arising from creeping hyphae, mononematous, micronematous, erect, straight or curved, subhyaline, 3-50 µm in length, 1.2-4 µm in diam. Conidiogenous cells terminal or intercalary, monoblastic. Conidia single or grouped, light to dark brown, thick walled. Conidial filament 2 to many septate, constricted at the septa; straight, curved, or irregularly coiled, sometimes branched, 5-14 µm long, 2.5-5.5 µm in diam.

SUBSTRATE: On dead culms of Cocos nucifera L.

DISTRIBUTION: India

4. Zalerion varium Anastasiou. Canad. Jour. Bot. 41:1136. 1963. (as Z. varia) (Fig. 4).

Marine fungus. Colonies on natural substrate black, partially embedded; mycelium immersed, composed of branched, septate, hyaline hyphae. Conidiophores micronematous, simple, septate, superficial, hyaline to light olive-colored, up to 30 µm long and 2-3.5 µm in diam.; sometimes lacking. Conidia variable, solitary, developing blastogenously. Conidial filament 5-15 µm in diam., irregularly helicoid or coiled in three planes, forming a knot or ball of about 10 to 30 cells, 15-65 x 11-56 µm.

SUBSTRATE: Intertidal and drifting wood, coconut, submerged test panels, pilings; submerged leaves and seedlings of Rhizophora mangle L.

DISTRIBUTION: World-wide (Kohlmeyer & Kohlmeyer, 1979).

Key to the species of Zalerion

1. Coiled conidia 30-50 µm in diam. 2
1. Coiled conidia rarely exceeding 20 µm in diam. 3
    2. Conidial filament 4-30 septate, regularly coiled in 1-5 times, conidia 19-50 µm diam. . . . . Z. maritimum
    2. Conidial filament 5-15 µm wide, variable in form, irregularly helicoid or coiled in three planes to form conidia 15-65 x 12-56 µm. . . . . Z. varium
3. Conidial filament 2 to many septate, straight, curved or irregularly coiled, 5-12 x 2.5-5.5 µm. . . . . Z. sachidanandii
3. Conidial filament mostly of 2-7 cells, constricted at the septa, often verruculose, 4-7 µm in diam.; when coiled, 10-20 µm in diam. . . . . Z. arboricola

DISCUSSION

The genus *Zalerion* was established to accommodate species of marine fungi, and like *Cirrenalia* Moore and Meyers, terrestrial species have been subsequently assigned to the genus. Kohlmeyer and Kohlmeyer (1979) considered *Z. arboricola* as improperly assigned to *Zalerion*, based on morphological and developmental considerations and it is quite probable that *Z. sachidanandii* would be viewed similarly. A taxonomic revision of the genus *Zalerion* is beyond the scope of this paper, but it seems apparent that *Zalerion*, like *Cirrenalia* (Goos, 1985) represents a diverse assemblage of fungi. Revision of the genus, however, should await the accumulation of additional collections, particularly of the terrestrial species.

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PREPARATION OF AGARIC MATERIAL FOR SEM EXAMINATION: AN IMPROVED METHOD

GRAHAM N. CHEESEMAN
AND
DARRYL W. GRUND

Department of Biology, Acadia University
Wolfville, Nova Scotia

SUMMARY

A procedure for preparation of agaric material for examination using the scanning electron microscope is described. The method reduces hymenial element collapse and overcomes basidiospore collapse so commonly encountered when air-dried material is used.

INTRODUCTION

The emphasis of spore studies during the last two decades has been towards the use of electron optic systems (Weber & Hess, 1974; Pegler, 1969; Madelin, 1966; Moore & Grand, 1970). The scanning electron microscope (SEM) is rapidly replacing the transmission electron microscope (TEM) as the tool for obtaining data of surface features. These instruments were used in a complementary fashion (Pegler & Young, 1972); however, more recent studies favor the SEM (Bassi & Cetto, 1973; Bassi, Facchinetti, & Cetto, 1975).

Moore & Grand (1970) examined spores from the Boletaceae, Strobilomycetaceae, Russulaceae, Tricholomataceae, an Hydnaceae, as well as samples from the Gasteromycetes, rusts, and smuts. Their work indicates that in the SEM, exsiccata (as old as 67 years) yields comparable results to fresh material and that the SEM is unrivaled as the tool for examining surface features of spores.

In 1979 we purchased a JEOL JSM25 scanning electron microscope and since then have examined spores of agarics, boletes, hydnums, ascomycetes, and gasteromycetes. We confirmed earlier reports (loc.cit.) that exsiccata gave similar data to fresh material in size and structure, however collapsing spores and hymenial elements remained a continuing problem. Spores of the Hydnaceae were particularly prone to collapse, as well as the agaric genera of Inocybe, Russula, and Cortinarius.

The following method for specimen preparation produced excellent results when tested on 45 species of Inocybe. Although this method is time-consuming, final satisfaction with the prepared specimens was worth the effort.

MATERIALS AND METHODS

To limit damage to valuable collections, the smallest possible section of lamellae was removed from each collection, and placed in a labelled screw-top vial, catalogued, and filed. Prior to examining the tissue in the scanning electron microscope (SEM), it was necessary to subject the tissue to the following procedures:

1. Rehydrate the tissue to expand selected hymenial elements to their original proportions.
2. Fix the tissue with the primary fixative.
3. Wash the tissue with distilled water.
4. Post-fix the tissue in osmium tetroxide.
5. Rewash the tissue with distilled water.
6. Dehydrate the tissue.
7. Critical point dry the tissue.
8. Mount the tissue on SEM stubs.
9. Sputter coat the tissue.

Exsiccata were rehydrated in a descending acetone gradient (100, 95, 80, 70, 50%, and distilled water). The vials containing the tissue were placed in a 30-vial holder (to prevent spillage), and each vial was filled one third full with the required concentration of solution and corked to prevent evaporation. After 10 minutes the old concentration was replaced by the new one, this procedure repeated until the tissues were in distilled water.

Excess water was siphoned from each vial and a primary fixative added until the vial was one-third full. Fixation took place at four degrees Centigrade and at pH 7.0 in 2.5% (0.1M) phosphate buffered glutaraldehyde solution. Fixatives were handled with rubber gloves, in a fume hood with the protective door opened sufficiently to permit handling. Once filled, the vials were placed in a refrigerator for the 3 hour fixation period. The buffer (Sorensen's phosphate buffer) was prepared as follows:

1. A 0.2M dibasic sodium phosphate solution was prepared by adding: $Na_2HPO_4.H_2O$: 35.61 g or $Na_2HPO_4.7H_2O$: 53.62 g or $Na_2HPO_4.12H_2O$: 71.64 g and adding distilled water to make 1000 ml.
2. A 0.2M monobasic sodium phosphate solution was prepared by adding: $NaH_2PO_4.H_2O$: 27.6 g or $NaH_2PO_4.2H_2O$: 31.21 g and adding distilled water to make 100 ml.
3. The final buffer (0.1M at pH 7.0) was prepared by adding 30.5 ml of dibasic sodium phosphate solution to 19.5 ml of monobasic sodium phosphate solution, and adding distilled water to make 1000 ml.

The fixative solution was prepared by adding:

1. Phosphate Buffer (Sorensen's): 50 ml
2. 25% glutaraldehyde: 10 ml
3. Distilled water: 40 ml

On completing the primary fixation, tissues were washed with three changes of distilled water (10 minutes/change) and post-fixed in 1% (aqueous) osmium tetroxide at room temperature for 30 minutes. Because of its high vapor pressure, only a few drops of osmium tetroxide were added to each vial. The cork plugged vials were kept in a fume hood throughout the fixation period and the used osmium was stored in a sealed amber bottle, for later return to the supplier. The tissues were washed in 3 changes of distilled water (10 minutes/change) and dehydrated in an ascending acetone gradient (distilled water, 50, 70, 80, 90, 95 and 100%) for 10 minutes in each concentration, prior to critical point drying.

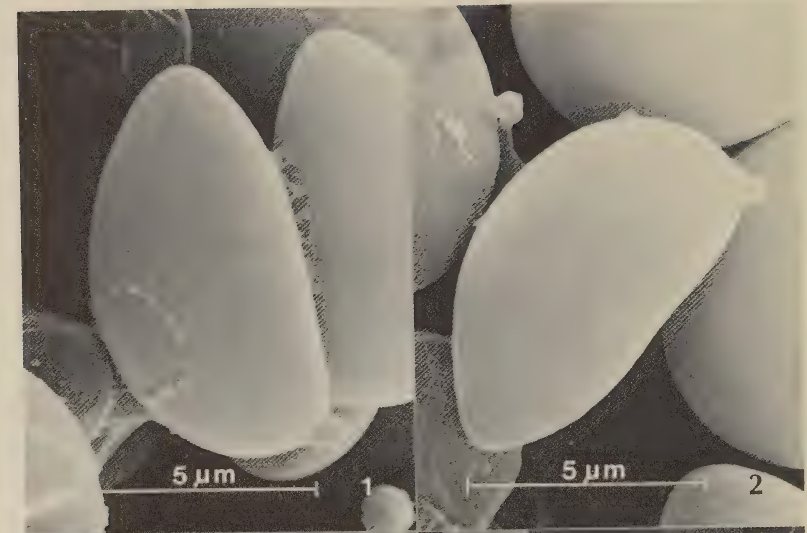
Tissues were critical point dried to 31.1 degrees Centigrade at 1070 psi in a Technics Critical Point Apparatus CPA II utilizing an internal adiabatically cooled chamber with carbon dioxide as the transition fluid. The chamber was cooled slowly by flushing carbon dioxide through it. This was done by opening the vent valve fully and the inlet valve sufficiently to maintain a chamber pressure of 300 psi. The chamber was considered cooled when liquid began to form in the chamber and the external surfaces felt cold. The cooled chamber was vented to atmospheric pressure and filled with 100% acetone. Tissues were placed in perforated snap-lid BEEM (t.m.) capsules and four of these per run were returned to the chamber. The chamber was sealed, brought up to tank pressure, and slowly flushed with liquid carbon dioxide for 2-3 minutes, not letting the pressure drop. The vent valve was closed, the chamber filled and the inlet valve closed, and then the power was turned on. Pressure, regulated by the vent valve, did not exceed 1300 psi. When the temperature reached the cutoff point (43 degrees Centigrade), the power was turned off, and the chamber slowly vented (120-180 psi drop/minute). Upon reaching atmospheric pressure, the dried tissues were stored in screw-top vials in a desiccator until they could be mounted on 10 mm diameter SEM stubs.

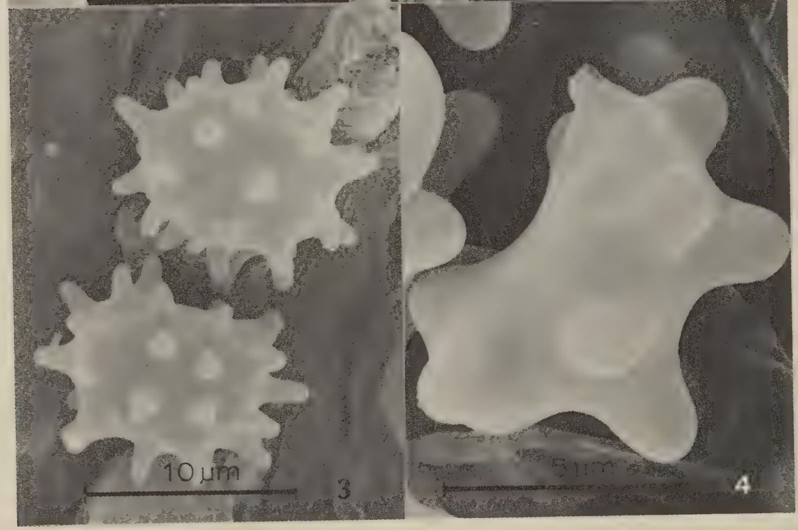
Dried tissue was mounted on stubs, using EM grade silver paint as both an adhesive and grounding device. Additional grounding and contrast enhancement was obtained by sputter coating the stub surface with a layer of gold/palladium alloy, in a Technics Hummer II Sputter Coater. Operating conditions were:

1. Pressure: 40-80 millitorr.
2. Current: 10 milliamperes
3. Voltage: position 11
4. Timer: auto
5. Pulse Mode: on

An initial 2 minute coating was applied (250 angstroms according to the manufacturer's data), with an additional 2 minutes if excessive charging was encountered.

Stubs were examined in a JEOL JSM25 scanning electron microscope at a working distance of 10 mm, objective aperture of 100 nm, accelerating voltage of 15 KV, and specimen tilt of 45 degrees. Certain stubs were also examined at 25 KV.





Figs. 1 and 2
Inocybe phaeoleuca, Acad 15255. Exsiccata and fresh tissue, respectively.

Figs. 3 and 4
Inocybe mixtilis, Acad 6262 and Inocybe longicystis, DG 1811. Both from exsiccata.

DISCUSSION

The above described procedure for stub preparation using agaric material is time-consuming, and chemicals must be handled with caution. We have used various methods, but found that hymenial elements usually collapsed, flattened, or became distorted. The time involved in locating basidiospores suitable for measurements and free of artifacts, can be considerable. Since a number of stubs can be prepared in a batch using the new method, the total time involved to obtain consistent and usable stubs is acceptable. Figures 1 to 4 show the results of using the method, where little difference in quality between stubs was observed. The photomicrographs were taken from Inocybe species, a genus that has basidiospores prone to collapse and distortion when prepared for the SEM.

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ASCORHIZOCTONIA GEN. NOV. AND COMPLEXIPES EMEND., TWO GENERA FOR ANAMORPHS OF SPECIES ASSIGNED TO TRICHARINA (DISCOMYCETES)

CHIN S. YANG[1] and RICHARD P. KORF[2]

Plant Pathology Herbarium, Cornell University, Ithaca NY 14853 USA

ABSTRACT

A new genus, **Ascorhizoctonia**, is proposed to include the fast-growing, **Rhizoctonia**-like anamorphs of some species of **Tricharina**. The new genus is characterized by fast-growing mycelium covering 90 mm petri plates of four media at room temperature in 5-7 da, mycelium being hyaline to brownish to brown, and producing swollen, chlamydospore-like cell aggregates (so-called "sporodochia").

Anamorphs of several species assigned to **Tricharina**, but yielding anamorphs other than **Ascorhizoctonia**, are grouped in the genus **Complexipes** Walker emend. They have slow to medium fast growth on potato dextrose agar and produce verrucose hyphae and, sometimes, characteristic chlamydospores **in vitro**. Members of this genus are potentially mycorrhizal with pinaceous conifers.

Generic descriptions for both genera, species descriptions for six new taxa and one new combination in **Ascorhizoctonia**, and a description of ascospore germination in **Tricharina** and in a proposed segregate genus are provided. A method for pure culture from ascospores in apothecia dried up to 10 or more years previously is described.

KEYWORDS: **Ascorhizoctonia, Rhizoctonia hiemalis**, E-strain fungi, **Complexipes, Tricharina**, mycorrhizae.

INTRODUCTION

During a recent monographic study of the Operculate Discomycete genus **Tricharina** Eckblad (≡ **Tricharia** Boudier), we examined a packet labelled (possibly by R.W.G. Dennis) **Tricharia** from a culture of **Rhizoctonia hiemalis** Saksena & Vaartaja in which apothecia had been produced by P.H.B. Talbot (Warcup and Talbot, 1966). The apothecial structures indicate that the fungus is a species of **Tricharina**, even though earlier Whitney and Parmeter

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[1] Anna E. Jenkins Postdoctoral Fellow in Mycology.

[2] Professor of Mycology, to whom all correspondence and all reprint requests should be addressed.

(1964) had identified the ascocarps they obtained by culturing **R. hiemalis** on agar covered with sterile sand as **Trichophaea** sp., possibly **T. bullata** Kanouse. Such a Discomycete-**Rhizoctonia** connection contradicts the other holomorphic associations of Basidiomycetes with **Rhizoctonia** (Talbot, 1970; Tu and Kimbrough, 1978). Cultures obtained from Keith N. Egger, University of Victoria, British Columbia, and others obtained by reviving and germinating ascospores from dried specimens of **Tricharina** spp. from various herbaria are also **Rhizoctonia**-like, with pale brown and fast-spreading mycelium often with right-angle branching, monilioid cells, and chlamydospore aggregates ("sporodochia"). We propose a new genus of the Mycelia Sterilia, **Ascorhizoctonia**, to accommodate the **Rhizoctonia**-like anamorphs of species of **Tricharina**. The new generic name reflects the ascomycetous affinities of the anamorphs.

Several other specimens identified as **Tricharina** were also revived from dried specimens, and their germinating ascospores yielded cultures of so-called "E-strain" fungi. These produce "crenulate" chlamydospores (Mosse and Bowen, 1968; Wilcox et al., 1974; Danielson, 1982; Yang and Wilcox, 1984). The chlamydospores are similar to those collected from soil and described as members of the genus **Complexipes** (Walker, 1979). Since these fungi are culturable on nutrient media and produce similar chlamydospores, the genus **Complexipes** is emended to include both anamorphs described as E-strain fungi and anamorphs derived in this study from some species previously assigned to **Tricharina**, but for which a segregate Discomycete genus is more appropriate for the teleomorph.

MATERIALS AND METHODS

Dried specimens of **Tricharina** spp. were obtained from various herbaria. The specimens were examined and separated into two groups on the basis of apothecial anatomy. The first group contains those with a distinctly two-layered excipulum: these yield **Ascorhizoctonia** anamorphs (TABLE 1). The second group (TABLE 2) is composed of those with a thick excipulum, in which the excipular layers become mixed and less distinctive near the apothecial base: these produce **Complexipes** or E-strain anamorphs.

Isolations were successfully made from specimens collected mostly within the past two decades. Some collections as much as 100 years old were also tried. A small piece of an apothecium was rehydrated in sterile distilled water in a sterile petri dish, briefly sterilized in 30% aqueous H_2O_2 for 1-1.5 min, rinsed in sterile distilled water several times until no gas bubbles appeared from the tissues, teased apart with forceps and dissecting needles, and the tissues then placed on water agar containing antibiotics (AWA: 1.2% (w/v) Difco Bacto-agar, 200 ppm chloramphenicol, and 200 ppm streptomycin sulfate [both antibiotics obtained from Sigma, St. Louis, MO] autoclaved for 20 min at 121 C. 15 psi before being poured into sterile disposable 90 mm diam plastic petri plates). The apothecial fragments on AWA were examined under a dissecting microscope for any spore germination or growth from germ tubes for 2 to 4 wk. Apothecial fragments which showed no growth after this time were removed from the plates, air-dried on a labelled paper, placed in a small glassine envelope, and returned to the original herbarium packet.

Signs of spore germination and hyphal growth from germ tubes could usually be observed in 2 da for those yielding **Ascorhizoctonia** anamorphs, but several of those yielding **Complexipes** anamorphs germinated only 7-14 da after apothecial fragments were placed on AWA. **Tricharina praecox** (Karst.) Dennis produced hyphae in 36-48 hr. Portions of the tissues and germinating ascospores were mounted in cotton blue 706-lactic acid (Korf, **1952**) to confirm that what was seen was spore germination and not contamination. Germinating ascospores and their germ tubes usually stained deeply with cotton blue in contrast to the usually yellow-refractive, unstained, non-germinating spores. With this procedure many dried collections were revived and pure cultures were obtained with minimal contamination.

The germinating ascospores or tissues were transferred onto potato dextrose agar (PDA: Difco, Detroit, MI) plates. Those we refer to **Ascorhizoctonia** spread quickly and covered the 90 mm petri plate in 5-7 da, while those of **Complexipes** took 3-4 wk or longer to reach a colony diam of 5 cm.

Comparative culture studies were made of 17 cultures of **Ascorhizoctonia** on four different culture media. The 17 cultures included **Rhizoctonia hiemalis** (ATCC #14016, obtained through Dr. C.J.K. Wang at the College of Environmental Science and Forestry, State University of New York, Syracuse, NY), K.N.E. #971 amd #1126 (from K.N. Egger), and 14 selected isolates derived from herbarium specimens (TABLES 1, 3). An isolate of **R. solani** Kühn (Plant Pathology Teaching Culture Collection #84-079, Cornell University) was used as a reference for comparison. The four media were water agar (WA: 1.2% Difco Bacto-agar in distilled water), PDA, cornmeal agar (CMA: Difco), and 2% malt extract agar (MEA: 2% Sigma malt extract and 1.5% Difco Bacto-agar). Inoculation was made by placing in the center of the plates an 8 mm mycelial disc cut from an actively growing culture on PDA. Growth rates of mycelia were determined from measurement of radial diameter on plates on the 4th da. All plates were incubated in the dark at 24 C. Mycelial morphology was characterized on the 7th and 35th da. Microscopic characteristics were examined by mounting pieces of the colonies in cotton blue-lactic acid. Sudan IV dissolved in 95% ethyl alcohol was used to detect oil globules in the hyphae.

Cultures of **Complexipes** were grown on PDA plates. No growth rates were measured, but mycelial morphology and microscopic characteristics were studied with the procedure described above. Three isolates were obtained from herbarium specimens (TABLE 2). Modified Melin-Norkrans (MMN) medium (Marx, **1969**) was occasionally used to culture **Complexipes** to determine whether the cultures were able to produce terminal chlamydospores.

Living cultures of **Ascorhizoctonia** spp. have been deposited at ATCC, CBS, DAOM, and IMI, and with Dr. G.C. Adams, Michigan State University, East Lansing, MI. Dried culture specimens to serve as holotypes were prepared with the technique described by Pollack (**1967**) for deposit at CUP, and isotypes have been deposited at K, PRM, and S. Living cultures of **Complexipes** spp. derived from apothecia are also deposited with the same five culture collections.

Table 1. Information on dried herbarium specimens assigned to *Tricharina* and either yielding *Ascorhizoctonia* anamorphs in germination trials or having apothecial structure with a distinctly two-layered excipulum.

Species authors' designation	 labelled name	Geographical origin & herbarium[1]	Collector	Collection date	Germination in trial & culture no.	Reference or herbarium no.
T. praecox	*T. praecox*	UK in K	MC Clark	6.5.1979	yes, C.S.Y. 93-ps[2]	MC Clark 2197
T. praecox	*T. praecox*	UK in K	B Spooner	15.4.1984	yes, C.S.Y. 86-ps	------
T. praecox	*T. praecox*	UK in K	RWG Dennis	22.5.1963	no, ------	Dennis (1971)
T. praecox	*T. praecox*	UK in K	------	24.5.1963	no, ------	------
T. praecox	*T. gilva*	Norway in TRH	H Dissing & S Sivertsen	17.8.1979	yes, C.S.Y. 95-ps	HD & SS 79-63
T. praecox	*T. gilva*	Norway in TRH	S Sivertsen	16.8.1978	yes, C.S.Y. 94-ps	------
T. praecox	*T. gilva*	Norway in C	S Sivertsen & H Dissing	17.8.1979	yes, C.S.Y. 103-ps	MO 79.56
T. cretea	*T. gilva*	Sweden in S	R Kristiansen	13.8.1982	yes, C.S.Y. 87-ps	------
T. cretea	*T. gilva*	Switzerland in Luzern	J Breitenbach	11.4.1977	yes, C.S.Y. 90-ps	Breitenbach & Kranzlin (1981)
T. cretea	*T. praecox*	Czechoslovakia	Z Pouzar	13.6.1978	yes, C.S.Y. 89-ps[3] C.S.Y. 88-ss	PRM 818903
T. cretea	*T. gilva*	Norway in C	S Sivertsen & H Dissing	25.8.1981	yes, C.S.Y. 101-ps	MO 81.118
T. groenlandica[4]	*Tricharina* sp.	Greenland in C	H Dissing	20.7.1983	yes, C.S.Y. 104-ps	GR 83.03
T. gilva	*T. gilva*	Czechoslovakia	L Kubickova	19.5.1964	no, ------	PRM 611371
T. gilva	*T. gilva*	ditto	J Kubicka & L Kubickova	24 & 28.9. 1960	no, ------	PRM 823505
T. gilva	*T. gilva*	ditto	J Kubicka	18.4.1960	no, ------	PRM 620639
T. gilva	*Tricharina* sp.	Norway in TRH	H Dissing & S Sivertsen	18.8.1979	yes, C.S.Y. 98-ps	HD & SS 79-108

			S Sivertsen			
T. gilva	Tricharina sp.	Greenland in C	S Sivertsen & H Dissing	6.8.1982	yes, C.S.Y. 107-ps	GR 82.123
T. gilva	T. praecox	Denmark in C	------	1973?	yes, C.S.Y. 108-ps	S 73.050
T. ochroleuca	Tricharina sp.	Norway in C	S Sivertsen & H Dissing	18.8.1979	yes, C.S.Y. 102-ps	MO 79.76
T. ochroleuca	T. praecox	Greenland in C	H Dissing	7.8.1983	yes, C.S.Y. 105-ps C.S.Y. 106-ps	GR 83.107

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1. Herbarium abbreviations follow the "Index Herbariorium part I. The Herbaria of the World", 7th edition, Utrecht 1981, Regnum Vegetabile vol 106.
2. ps = polyspore isolate.
3. ss = single spore isolate.
4. A new species being described (Yang & Korf, 1985).

RESULTS

A. Spore germination of Tricharina spp. yielding Ascorhizoctonia anamorphs.

Germination occurred in specimens collected during the last 10 years, even though some appear to have been subjected to fumigation treatments to rid them of pests. Those 20 years old or older failed to show any sign of viability on the plates even after one month. Germination results are noted in TABLE 1.

Those ascospores in apothecial fragments that germinated probably all did so within 48 hr after the rehydration treatment. Hyphae extending from the apothecial pieces could be seen with the naked eye in 2 da. The germ tube (FIG. 1, a-d) that emerged mostly subterminally from one end of the ellipsoid ascospore was continuous with the inner wall of the spore. The broken outer wall was distinguishable when mounted in cotton blue-lactic acid (FIG. 1a, b, d). A second germ tube may start growing from the other end of the spore after the first germ tube has elongated. A septum was often soon laid down between the spore and the elongating germ tube. All growth observed was from germinating ascospores, and no growth from apothecial hyphae was found.

Germinating spores took up cotton blue quickly from the mounting medium and contained some small organelles visible under the light microscope, but lacked conspicuous oil globules. Non-germinating ascospores resisted the uptake of cotton blue and remained refractive-yellow. The germ tube was fast-growing and evolved into filamentous hyphae on AWA. The hyphae at first were straight and did not fuse with other nearby hyphae (FIG. 2), but sometimes were coiled into loops with anastomoses and hyphal bridges in the loops. The hyphae when grown on AWA for a period of time formed aggregates of swollen, chlamydospore-like cells (FIG. 3) in or on agar, termed "sporodochia" in much of the literature on **Rhizoctonia**.

Table 2. Information on dried herbarium specimens previously assigned to *Tricharina* and either yielding *Complexipes* (E-strain) anamorphs in germination trials or having apothecial structure with thick excipulum and not so distinctive layering near the base.

Final name[1] and (labelled name)	Geographical origin	Collector	Collection date	Germination in trial & culture no.	Reference or herbarium no.
"*Tricharina mikolae*" (*T. gilva*)	The Netherlands	G Piependroek-Groters	1982	yes, C.S.Y. 91-ps C.S.Y. 92-ps	CUP 60689 ex L; L; van Brummelen (1983).
"*Tricharina* n. sp."[2] (*T. gilva*)	Alaska, USA	P Kempton	6.5.1963	no, ------	CUP 60695 ex NY; NY
"*Tricharina* n. sp."[3] (*T. amphidoxa*)	Norway	S Sivertsen	19.9.1974	yes, C.S.Y. 85-ps	TRH
"*Tricharina* n. sp."[3] (*Humaria gilva*)	Berlin, Germany	P Sydow	July, 1885	no, ------	Sydow Mycoth. March. 775 (S-Rehm)
"*Tricharina* n. sp."[3] (*Humaria gilva*)	Berlin, Germany	P Sydow	July, 1885	no, ------	Sydow Mycoth. March. 775 (S-Sydow)
"*Tricharina* n. sp."[3] (*H. melaloma*)	Washington State, USA	AH Smith	3.7.1939	no, ------	AH Smith 14748 in MICH; Kanouse (1947).
"*Tricharina* n. sp."[3] (*Tricharina* sp.)	Hierro, Canary Islands	RP Korf, R Fogel, GL Hennebert, & LM Kohn	8.1.1977	yes, C.S.Y. 100-ps[4]	CUP-MM 1421; OSC

[1]. All species are now placed in a new genus (Yang and Korf, 1985).

[2]. This Alaskan species is described as new (Yang and Korf, 1985).

[3]. This widely distributed species is also described as new (Yang and Korf, 1985).

[4]. Culture obtained, very low germination rate, no early stage of spore germination observed, slow growth rate.

Table 3. Mycelial growth of species of *Ascorhizoctonia* on four media as measured in radial diameter in cm[1].

	WA	CMA	MEA	PDA
Ascorhizoctonia praecox				
C.S.Y. 86-ps	5.70-6.20	6.70-7.20	5.50-6.0	7.10-7.60
C.S.Y. 94-ps	5.80-6.10	6.50-6.90	5.40-5.60	7.40-7.70
C.S.Y. 95-ps	5.80-6.20	6.30-6.60	4.90-5.40	7.10-7.30
C.S.Y. 103-ps	5.80-6.10	6.10-6.50	5.0-5.30	6.90-7.50
Ascorhizoctonia intermedia				
K.N.E. 971-ps	5.40-5.60	7.20-7.40	5.70-6.20	7.50-8.0
K.N.E. 1126-ps	5.10-5.30	6.90-7.20	5.80-6.0	7.30-7.70
Ascorhizoctonia cretea				
C.S.Y. 87-ps	7.30-7.50	7.90-8.50	7.20-7.60	7.90-8.50
C.S.Y. 89-ps	7.20-7.40	7.80-8.50	7.0-7.20	8.50[2]
C.S.Y. 90-ps	7.20-7.70	8.10-8.50	7.30-7.60	8.30-8.50
Ascorhizoctonia groenlandica				
C.S.Y. 104-ps	6.40-6.60	7.40-7.70	6.30-6.40	6.70-7.50
Ascorhizoctonia gilva				
C.S.Y. 98-ps	7.0-7.20	6.50-6.70	6.90-7.10	7.30-7.70
C.S.Y. 99-ps	7.30-7.40	7.10-7.40	6.80-7.10	7.20-7.40
C.S.Y. 107-ps	7.20-7.40	7.0-7.20	7.0-7.40	6.80-7.40
Ascorhizoctonia ochroleuca				
C.S.Y. 102-ps	8.10-8.50	7.50-7.70	7.30-8.0	8.50[2]
C.S.Y. 105-ps	8.50[2]	7.50-7.90	6.90-7.80	8.50[2]
C.S.Y. 106-ps	8.30-8.50	7.40-8.30	7.50-7.80	8.50[2]
Ascorhizoctonia hiemalis				
ATCC 14016	1.80-2.20	1.60-1.70	1.60-1.80	1.60-2.0
Rhizoctonia solani				
84-079	8.0-8.20	8.50[2]	7.50-7.90	7.90-8.30

1. All measurements are the range of radial diameters on four petri plates taken on the fourth day after inoculation at room temperature (approximately 24 C).
2. Covered the 90-mm petri plates, which have the lid 90 mm diam but the bottom of only 85 mm diam.

B. Spore germination of **Tricharina** spp. yielding **Complexipes** anamorphs.

Attempts were made to culture from 7 herbarium specimens representing three taxa collected in the past century having apothecial structures similar to **T. mikolae** Yang & Wilcox (1984) (TABLE 2). Three specimens collected in the past decade germinated in the trials, all yielding **Complexipes** anamorphs (or so-called "E-strain" fungi). Ascospore germination here was slower than with species yielding **Ascorhizoctonia**. Germination and growth could only be observed under a dissecting microscope 7–14 da after the rehydration treatment.

Prior to terminal or subterminal emergence of the germ tube (FIG. 1 e–h) from one end of the spore, the germinating spores imbibed water, swelled, and at times laid down a septum within the spore (FIG. 1 g–h). The germ tube was often swollen, and the germ tube became constricted at a septum near the spore (FIGS. 4, 5). After a few more swollen or chlamydospore-like cells are produced from the emergent germ tube, cylindrical hyphae then extend terminally or branch out from the chlamydospore-like cells. The elongating germ tube, the chlamydospore-like cell-chains, and the cylindrical hyphae often twist and intermingle with other nearby hyphae or cell-chains (FIG. 6), but no true anastomoses or hyphal bridges can be observed at this stage. Abundant oil globules were found in the germinating spores and all subsequent structures. A second germ tube may also be produced from the other end of the spore after the initial germ tube has elongated.

The initial hyphae were hyaline, smooth, and stainable in cotton blue, but over time became brownish, verrucose, and resistant to cotton blue-staining. Additional chlamydospore-like cells in chains were produced in the mycelium submerged in the agar, while aerial hyphae were mostly cylindrical. The mycelium derived from the spores was slow-growing, and produced a 5 cm diam colony only after 3–4 wk or longer when transferred onto nutrient media. Subcultures from the mycelium were slow-growing to medium fast-growing on PDA.

C. Culture studies and generic description of **Ascorhizoctonia**.

Cultures belonging to the genus **Ascorhizoctonia** are fast-growing on all four media used, although the culture of **A. hiemalis** (ATCC #14016) grew very slowly in comparison with the others (TABLE 3) and with the original growth rate (84 mm on PDA at 25–26 C in 6 da) given by Saksena and Vaartaja (1960). The large deviation in growth rate is probably due to degeneration of the culture under long-term (25 yr) culture preservation and transfer.

The growth diameters presented in TABLE 3 were recorded on the fourth da after inoculation, because at this time the fungi covered 50% to 100% of the surface of 90 mm petri plates, allowing comparisons to be made. Six taxa were studied in addition to **A. hiemalis** (ATCC #14016) and **Rhizoctonia solani**. The first three species (**A. praecox**, **A. intermedia**, and **A. cretea**) are all from fire sites with apothecial structures similar to the type specimens of **Tricharina praecox** and **T. cretea** (Cooke) Thind & Waraitch. The fourth species (**A. groenlandica**) was represented by one isolate from a new species of **Tricharina** recently collected in Greenland by Henry Dissing. The fifth species (**A. gilva**) had three isolates with

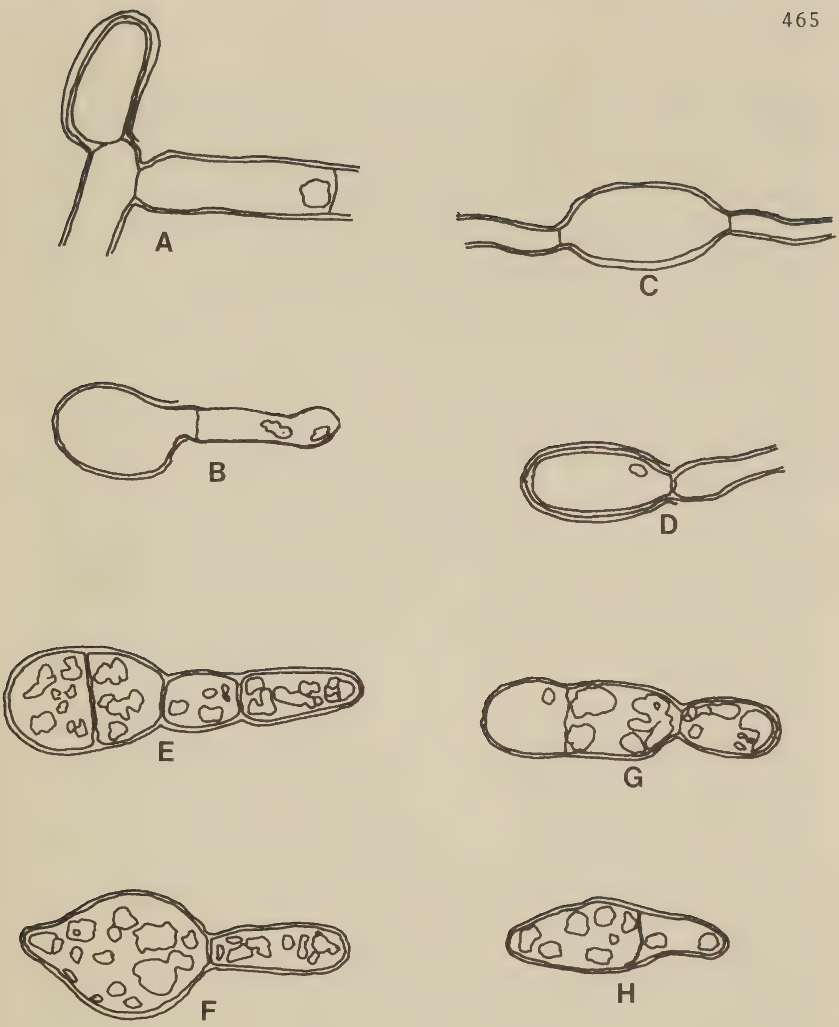


FIG. 1

FIG. 1. Ascospore germination in species assigned to **Tricharina**, all X 1000, drawn with the aid of a drawing tube. a–d. Species yielding **Ascorhizoctonia** anamorphs. a. A germinating spore of **T. cretea** (Kristiansen, 1982). b. A germinating spore of **T. cretea** (PRM 818903) showing a subterminal germ tube. c, d. Germinating spores, unipolar and bipolar, of **T. groenlandica** (GR 83.103 ex C). e–h. Species yielding **Complexipes** anamorphs. e, f. Germinating spores of **T. mikolae** (CUP 60689) with oil granules; e, note septum in the spore. g, h. Germinating spores of a new species (Sivertsen, 19.9.1974, ex TRH) each with a septum and rich in oil globules.

teleomorphs similar to the type specimen of **T. gilva** (Boud. in Cooke) Eckbl., with growth rates similar to but slightly slower than those of the sixth species (**A. ochroleuca**). The three isolates of this last were isolated from specimens similar in structure to that of an authentic specimen of **T. ochroleuca** (Bres.) Eckbl. The apothecial structures of the teleomorphs, **T. gilva** and **T. ochroleuca**, are also similar, with only minor differences.

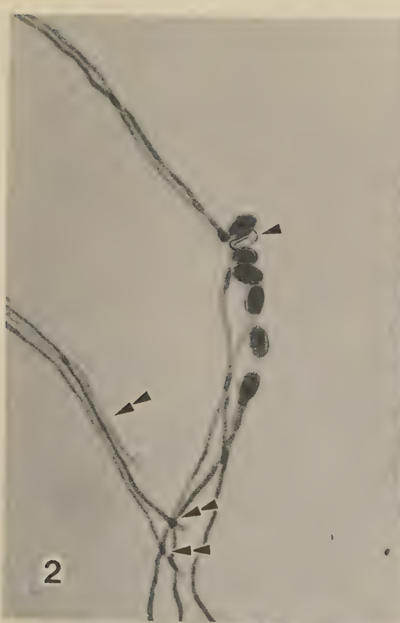
Mycelial morphology of these six species differs from **A. hiemalis** (as represented by ATCC #14016) and from **Rhizoctonia solani**, as well as from one another. **Ascorhizoctonia praecox** and **A. intermedia** consistently form concentric bands in the dark on MEA and PDA plates at 1 wk (FIG. 7), while those of **A. cretea** do not form concentric bands on any medium used. The concentric bands formed by the two isolates of **A. intermedia** were conspicuous on MEA but inconspicuous on PDA. All cultures of these 3 species produce hyphal loops on WA and CMA. **Ascorhizoctonia groenlandica** produces conspicuous concentric bands in 1-wk old CMA, MEA, and PDA plates, but the bands disappear in aged plates (FIG. 8a). Both **A. gilva** and **A. ochroleuca** form rather inconspicuous bands in 1 wk on all media, but produce conspicuous bands in 5-wk PDA plates (FIG. 8b, d). Plates of **A. gilva** at 5 wk become dark brown with 3 to 4 dark bands within the agar, while those of **A. ochroleuca** at a similar time produce 3 to 4 bands of hyphal aggregates, which may fuse in 5-wk or older plates, on the agar surface.

All isolates are similar to **Rhizoctonia solani** in having fast-growing mycelium, brownish to brown colonies, production of hyphal aggregates ("sporodochia"), and in right-angle hyphal branching, but only **A. ochroleuca** produces abundant hyphal aggregates on the agar surface which might be mistaken for the "sclerotia" of a **Rhizoctonia.** The 5-wk plates of **A. ochroleuca** produce such aggregates in bands (FIG. 8d), whereas similar aggregates can be found in cultures of **R. solani** as early as 1 to 2 wk after inoculation.

Hyphae on all four agar media are hyaline initially but gradually turn brown to brownish. The hyaline hyphae are smaller in diam (2–8 µm), thin-walled, and always smooth. On the other hand, brownish to brown hyphae are usually wider, up to 14 µm broad, thin- to thick-walled (walls up to 1.5 µm thick), and smooth or slightly to densely incrusted.

Monilioid cells are produced by swelling of newly initiated branches from cylindrical hyphae, or arise as blown out intercalary

FIGS. 2–6. Ascospore germination of species assigned to **Tricharina.** 2–3. **Ascorhizoctonia** anamorphs. 2. Six of the seven spores in an ascus of **T. gilva** germinated with cylindrical germ tubes growing parallel to one another without forming anastomoses with those from the same ascus or those (double arrow) from other asci; one of the non-germinating spores (second from top, arrow) remains refractive and does not take up cotton blue stain (S-73.050 ex C), X365. 3. "Sporodochium" or chlamydospore aggregation formed in water agar by **A. praecox** (C.S.Y. 94-ps); note dark-staining cytoplasm and some unstained, senescent chlamydospore chains, X365. 4–6. **Complexipes** anamorphs. 4. Germinating ascospores producing constricted germ tubes consisting of swollen cells in chains (CUP 60689), X220. 5. Germinating ascospores with a septum formed in the ascospore (arrow) (CUP 60689), X570. 6. A cluster of germinating spores producing chains of swollen cells twisted together; cylindrical hyphae developed from the swollen cells (CUP-MM 1421), X145.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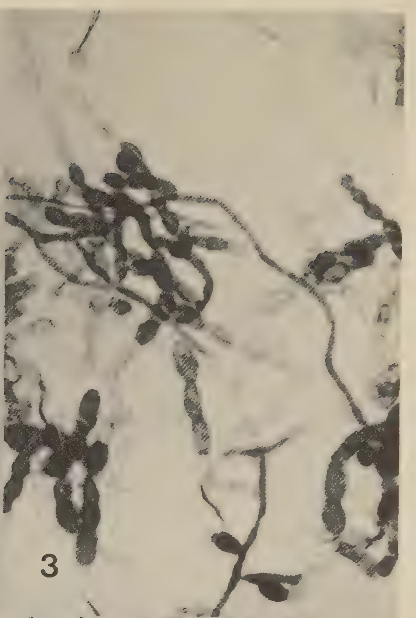
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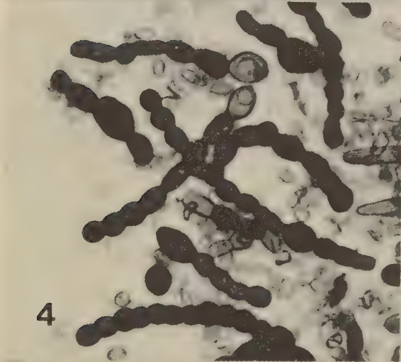
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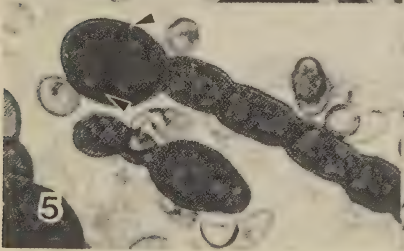
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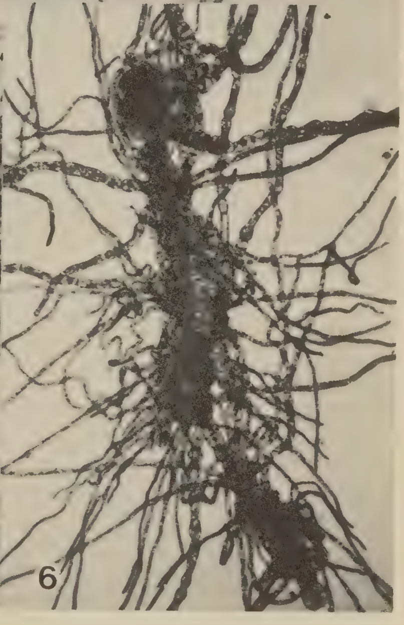
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cells of hyphae. The monilioid cells reproduce themselves, often become branched, and form aggregates of the sort often referred to as "sporodochia" in the literature on **Rhizoctonia**, although no conidia are produced. The aggregates of monilioid cells are either produced on the agar surface or embedded in the agar. They can grow into large aggregates 3-4 mm in diam on aged plates, and can be classified as "the loose type of sclerotia" as defined by Townsend and Willetts (1954). The structure of the aggregates produced by **Ascorhizoctonia** is not differentiated into a medulla and an outer rind, as in true sclerotia. The monilioid cell-chains are mostly composed of limoniform cells, with flattened ends at the septal constrictions, are smooth, brownish to brown, thin-walled, and contain oil globules. Senescent monilioid cells are often highly vacuolate, and often have small oil drops condensed into larger oil drops up to 17 mm in diam. Septa with simple septal pores and Woronin bodies are easier to observe in these senescent monilioid cell-chains with or without staining, but staining with cotton blue 706 makes Woronin bodies, which become blue, distinguishable. The senescent monilioid cells eventually collapse and no longer take up cotton blue stain.

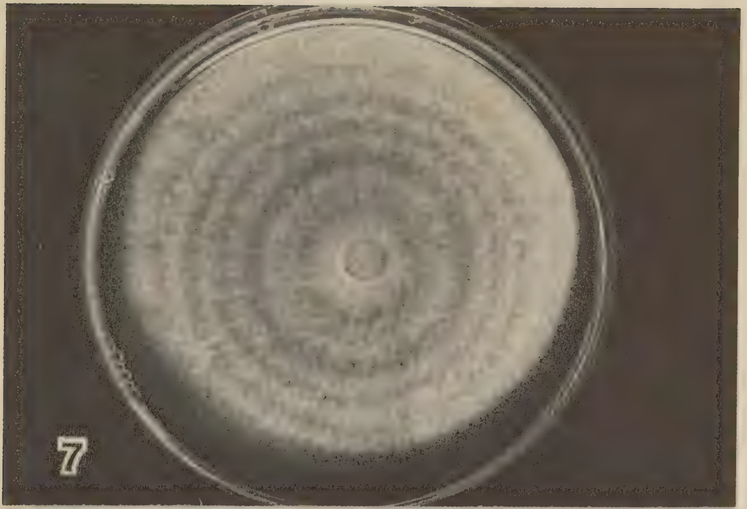
ASCORHIZOCTONIA Yang & Korf, **gen. nov.**

Coloniae celeriter crescentes, hyalinae vel brunneae, patellas petrianas 90 mm latas agarum + aquam, agarum + Zeae *farinam, agarum + hordei tosti extractum, agarumve +* Solani tuberosi *dextrosum continentes 5-7 diebus temperatura ca 21 C velantes. Mycelium adpressum, immersum, superficiareve, annulis concentricis praesentibus absentibusve, cellularum monilioidearum caespites sporodochiis similes super agaro vel intra agarum saepe producentibus. Hyphae cylindricales, septatae, 2.0-13.0 mm latae, hyalinae vel brunneae, laeves vel sparsim verrucosae, aut parallele jacentes aut paene ad angulum 90° ramificantes, cellulis globulis oleosis repletis. Circuli et ponticuli hyphales praesentes vel absentes. Nec sclerotia vera nec bulbili procreati.*

Typus: Ascorhizoctonia praecox *Yang & Korf.*
Teleomorphosis: Tricharina *Eckbl. emend. Yang & Korf.*

Similar to **Rhizoctonia**, but teleomorph **Tricharina** (Ascomycetes) and septa simple, not dolipore. Colonies fast spreading, covering 90 mm petri plates at room temperature in 5-7 da on WA, MEA, CMA, and PDA, hyaline to brownish on WA, pale brown on MEA, pale brownish to brownish on CMA, and grayish brown to brown with reverse brown on PDA. Mycelium immersed and superficial, forming concentric bands in or on the agar or not. Hyphae cylindrical, simple-septate, growing apices rounded or rarely pointed, anastomo-

FIGS. 7-8. Cultures of **Ascorhizoctonia** spp. 7. **A. praecox**, a five da old culture on PDA almost filling the 90 mm plate and forming several conspicuous bands (C.S.Y. 95-ps), X0.83. 8. Four 5-wk old cultures of **Ascorhizoctonia** spp. on PDA showing concentric band formation and different mycelial textures, all X0.5. a. **A. groenlandica**, bands masked (C.S.Y. 104-ps). b. **A. gilva**, dark bands within agar (C.S.Y. 107-ps). c. **A. praecox**, bands masked (C.S.Y. 95-ps). d. **A. ochroleuca**, bands on agar surface (C.S.Y. 102-ps).



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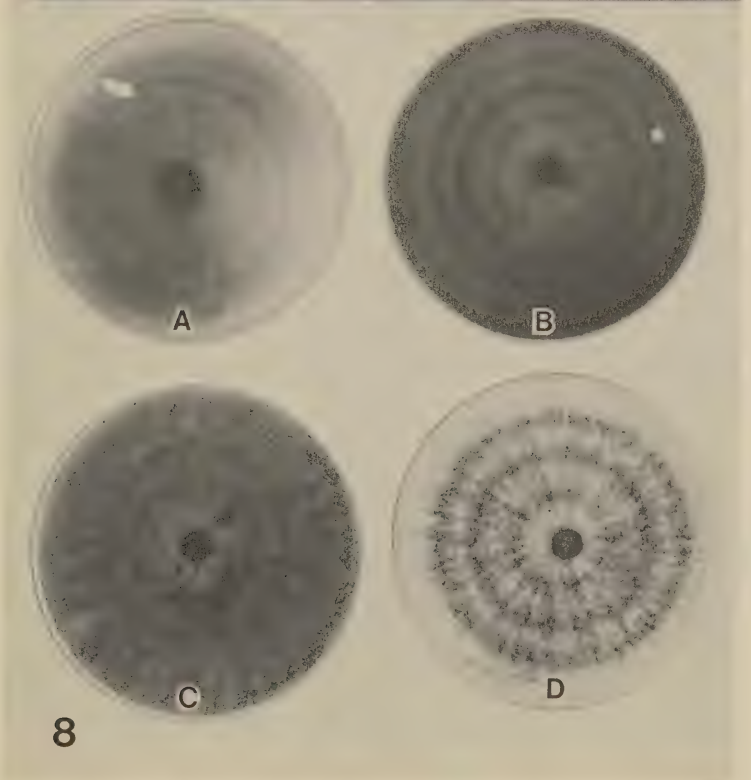

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ses rare to frequent, hyphae of two kinds, some of small diam, hyaline, smooth, 2-8 µm broad, others of larger diam, brown to brownish, smooth or slightly to densely incrusted, 7-14 µm broad. Hyphae usually either lie parallel to one another, or branch at nearly a right angle, slightly or not constricted at the junction of hypha and branch, with a delimiting septum at the junction or up to 5-7 (-10) µm into the branch. Hyphal cells filled with small oil globules. Terminal, thin-walled chlamydospores rarely produced. Monilioid cells ("sporodochia") commonly formed on or in the agar medium. Neither true sclerotia (with a rind) nor bulbils produced.

D. Species descriptions for Ascorhizoctonia.

1. ASCORHIZOCTONIA CRETEA Yang & Korf, sp. nov.

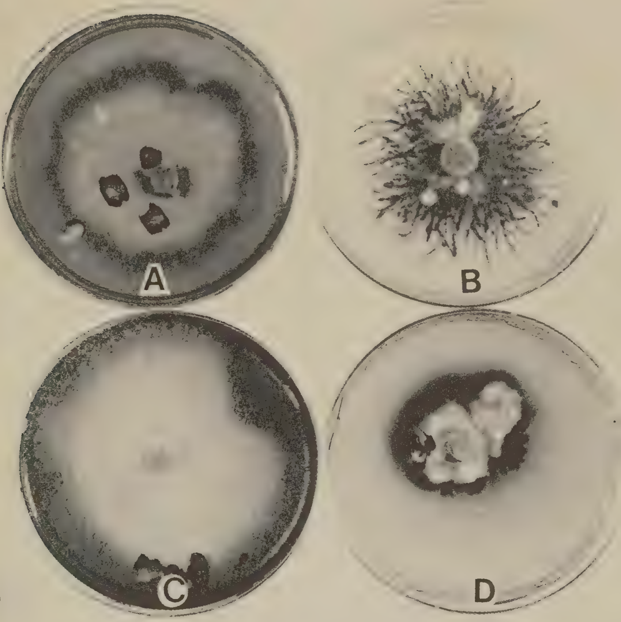
Ab **A. praecoxi** *absentia annulorum concentricorum in mediis 4 omnibus differens.*

Holotypus: Suecia, R. Kristiansen, CUP 61604, (ex C.S.Y. 87-ps).
Teleomorphosis: **Tricharina cretea** *(Cooke) Thind & Waraitch.*

Mycelium fast spreading, covering 90 mm plates of four media in 5-7 da, concentric bands absent. Mycelium appressed and immersed on WA, CMA, and MEA, producing hyphal loops on WA and CMA; mycelium on PDA pale brown to brownish, reverse dark brown, with abundant aerial hyphae. Hyphae on all media (2-) 3-13 (-15) µm broad, simple-septate, hyaline to brownish and smooth, or brownish and slightly verrucose on PDA, wall 0.5-1.0 (-1.5) µm thick, cells filled with abundant oil globules, hyphae branching at a right or an acute angle, slightly or not constricted at the junction of the branch, with a delimiting septum (1.5-) 5-7 (-10) µm into the branch. Hyphal loops formed by hyaline hyphae 2-4 µm broad, hyphal bridges frequent in the loops. Aggregates of monilioid cells or "sporodochia" present on all media.

FIG. 9. Cultures of **Complexipes** spp. on PDA, 4 months old, X0.5. a. Derived from a new tetrasporous variety of **Tricharina mikolae** (CUP 60628; C.S.Y. 57); note marginal rope-like strands growing from edge of colony. b. **Tricharina mikolae** (CUP 60689, ex L; C.S.Y. 92); note most of colony consists of rope-like strands. c. Derived from a new species, collected in Norway (S. Sivertsen 19-9-1974, ex TRH; C.S.Y. 85); note relatively spread-out colony and absence of rope-like strands. d. The same new species as c, but collected in Canary Islands (CUP-MM 1421; C.S.Y. 100); note the slow-growing, restricted colony, and absence of rope-like strands.

FIGS. 10-11. Chlamydospores of **Complexipes** sp. (teleomorph: **Tricharina mikolae**). 10. An immature chlamydospore from a culture; notice few coarse ornamentations on spore surface and oil drops in the spore; the spore is hyaline but appears dark due to uptake of cotton blue stain (C.S.Y. 91-ps), X325. 11. Scanning electron micrograph showing a chlamydospore with fine ornamentations and membranous remnants on spore surface; apparently as the chlamydospore enlarges layers of an outer membrane peel off, and the ornamentations become smaller but more abundant (C.S.Y. 14-ps), X550.



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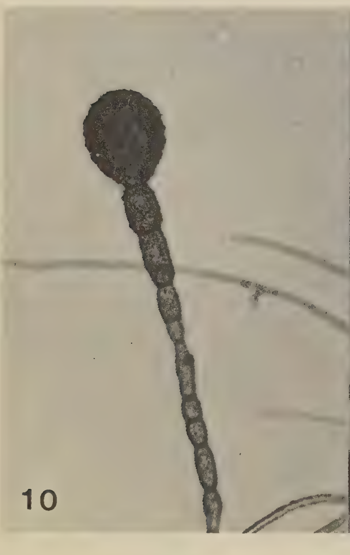

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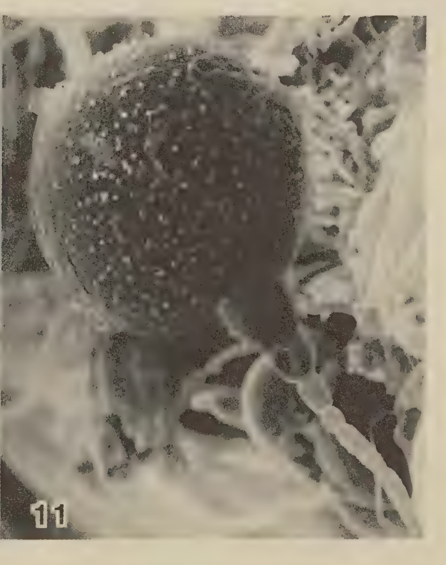

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Holotype: Dried culture derived from an isolate (C.S.Y. 87-ps) from a specimen collected in Sweden 13.8.1982 by R. Kristiansen, ex Herb. S, CUP 61604. (Isotypes in K, PRM, S.) Living cultures maintained at ATCC (#58706), CBS (#235.85), DAOM (#191899), IMI (#294723), and in the culture collection of Dr. G.C. Adams, Michigan State University, East Lansing, MI.

Paratypes: CUP 61611 (from C.S.Y. 89-ps), isolated from PRM 818903 (leg. Pouzar, Czechoslovakia, 1978); CUP 61612 (from C.S.Y. 90-ps), isolated from Breitenbach 1107-77 (Luzern, Switzerland, 1977). Isoparatypes are also deposited at C, DAOM, and NY.

2. ASCORHIZOCTONIA GILVA Yang & Korf, **sp. nov.**

Ab **A. ochroleuca** *coloniis atrobrunneis et annulis 3-4 concentricis fuscis intra agarum post 5 hebdomades in agaro +* **Solani tuberosi** *dextroso formatis differens.*

Holotypus: Groenlandia, Sivertsen and Dissing, CUP 61605, (ex C.S.Y. 107-ps).

Teleomorphosis: **Tricharina gilva** *(Boud. in Cooke) Eckbl.*

Colonies effuse, concentric bands inconspicuous, but becoming distinguishable in aged plates with 3 to 4 bands in dark brown agar medium (FIG. 8b). Mycelium from hyaline in WA to dark brown on PDA, appressed and immersed on WA and CMA, with pale brownish aerial hyphae on MEA and PDA, producing aggregates of monilioid cells or "sporodochia" on all media but MEA, particularly abundant on edge of CMA plates. Hyphae cylindrical, simple-septate, (2.0-) 4.0-11.0 (-13.0) µm broad, hyaline to brown, branching at a right angle or an acute angle, with a delimiting septum 0-5.0 µm into the branch, some pale brown hyphae with slight to dense granular incrustation, thick-walled brown hyphae smooth, wall 0.5-2.0 µm thick; all hyphae containing oil globules 2.0-4.0 (-6.0) µm in diam. Monilioid cells limoniform, rich in oil globules, relatively thin-walled, walls 0.5 µm thick or less.

Holotype: Dried culture derived from a specimen collected by S. Sivertsen and H. Dissing in Greenland, 6.8.1982, ex Herb. C, GR-82.123, CUP 61605. (Isotypes in K, PRM, S.) Living cultures maintained at ATCC (#58707), CBS (#236.85), DAOM (#191898), IMI (#294724), and in the culture collection of Dr. G.C. Adams, Michigan State University, East Lansing, MI.

Paratypes: CUP 61618 (from C.S.Y. 98-ps), isolated from specimen in Herb. TRH (leg. HD & SS 79-108, Norway, 18.8.1979); CUP 61619 (from C.S.Y. 99-ps), isolated from specimen in TRH (leg. HD & SS 82-88, Greenland, 6.8.1982). Isoparatypes are also deposited at C, DAOM, and NY.

3. ASCORHIZOCTONIA GROENLANDICA Yang & Korf, **sp. nov.**

Ab **A. praecoxi** *et taxis affinibus coloniis brunneis vel aureo-brunneis, mycelio circulis hyphalibus carente, et formatione annulorum 3-5 concentricorum in agaro +* **Zeae** *farina, in agaro + hordei tosti extracto, et in agaro +* **Solani tuberosi** *dextroso post unam hebdomadem, annulis post 5 hebdomades obscuratis, differens.*

Holotypus: Groenlandia, H. Dissing, CUP 61606 (ex C.S.Y. 104-ps).
Teleomorphosis: **Tricharina groenlandica** *Dissing, Yang, & Korf (Yang & Korf, 1985).*

Colonies effuse, forming 3-5 concentric bands on 1-wk old CMA, MEA, and PDA plates, which disappear on aged plates (FIG. 8a). Mycelium hyaline (WA) to brown (PDA), appressed and immersed on WA, CMA, and MEA, with abundant golden brown aerial hyphae on PDA, producing hyaline to pale brown aggregates of monilioid cells ("sporodochia") on WA and CMA, but these inconspicuous on 5-wk old MEA. Hyphae cylindrical, simple-septate, (2.0-) 4.0-10.0 µm broad, hyaline to pale brown, smooth, mostly thin-walled (0.5 µm), but some becoming thick-walled (wall up to 1.5 µm thick), most hyphae branching at an acute angle, delimiting septum 0-5.0 µm into the branch, cells containing oil globules usually less than 4 µm in diam. Monilioid cells subhyaline to pale brown, limoniform, thin-walled (wall 0.5 µm thick). Hyphal fusions between parallel hyphae occasional.

Holotype: Dried culture derived from an isolate (C.S.Y. 104-ps) from a specimen collected in Greenland 20.7.1983 by H. Dissing, ex Herb. C, GR-83.103, CUP 61606. (Isotypes in K, PRM, S.) Living cultures maintained at ATCC (#58708), CBS (#237.85), DAOM (#191897), IMI (#294725), and in the culture collection of Dr. G.C. Adams, Michigan State University, East Lansing, MI.

4. ASCORHIZOCTONIA HIEMALIS (Saksena & Vaartaja) Yang & Korf, **comb. nov.**

Basionym: **Rhizoctonia hiemalis** Saksena & Vaartaja, Canad. J. Bot. **38**: 940. 1960.

Holotype: Although Saksena and Vaartaja mentioned "isolate 2785" as type, nowhere in their paper (Saksena and Vaartaja, 1960) could we find information of any dried specimen being deposited in any herbarium, as is required by the International Code of Botanical Nomenclature. Our inquiries at SAFB, CBS, and DAOM herbaria have met with no success in finding such a specimen. We propose thus dried cultures on WA and MEA derived from ATCC #14016 (a subculture from original "type" isolate 2785) on deposit as CUP 61622 as the NEOTYPE SPECIMEN for this name until such time as the holotype or isotype specimen is discovered. The ATCC isolate has degenerated, probably due to its long period in culture. Some terminal chlamydospores apparently identical to those illustrated by Whitney and Parmeter (**1964**: f. 2) were found on the agar surface of a 4-mo old WA plate. The chlamydospores are globose to subglobose, 11.5-15.0 µm in diam, smooth, relatively thin-walled (0.5 µm thick), with cyanophilic contents, attached to a short, narrow, subtending hypha arising from the vegetative hyphae. This indicates that the culture, although it does not grow nearly as fast as originally reported, is still genetically similar to the original culture.

Teleomorph: **Tricharina hiemalis** Yang & Korf (**1985**).

Misapplications: **Trichophaea** cfr. **bullata** Kanouse, by Whitney & Parmeter, Mycologia **56**: 114-118. 1964; **Trichophaea** sp., by Warcup and Talbot, Trans. Brit. Mycol. Soc. **49**: 432. 1966.

For a culture description, the original (Saksena and Vaartaja,

1960) will serve our purpose, as it was based on more vigorously growing material than the isolate we have seen.

5. ASCORHIZOCTONIA INTERMEDIA Egger, Yang & Korf, sp. nov.

Ab **A. praecoci** *annulis concentricis post unam hebdomadem modo in agaro + hordei tosti extracto manifestis, in agaro +* **Solani tuberosi** *dextroso inconspicuis, differens.*

Holotypus: Canada, K. N. Egger #1126, 8.5.1984, CUP 61608 (ex K.N.E. 1126-ps).
Teleomorphosis: **Tricharina praecox** *(Karst.) Dennis var.* **intermedia** *Egger, Yang & Korf (Yang & Korf, 1985).*

Mycelium fast-growing, covering 90 mm petri plates of four media in 5-7 da, concentric bands formed on MEA, inconspicuous on PDA. Mycelium appressed and immersed on WA, CMA, and MEA, hyphal loops present on WA and CMA; mycelium hyaline on WA to brownish on PDA, reverse brown with 2 to 3 dark bands distinguishable on PDA, brownish aerial hyphae abundant on PDA. Hyphae (2.0-) 4.0-11.0 (-14.0) µm broad, wall 0.5-1.5 µm thick, simple-septate, hyaline to brownish and smooth, or brownish and smooth to slightly verrucose on PDA, cells filled with small oil globules mostly less than 3.5 but up to 6 µm in diam, but on MEA forming large oil drops; hyphae branching at a right angle or acute angle, delimiting septum 0-5 (-7) µm into the branch. Hyphal loops formed by hyaline hyphae 2-4 µm broad, hyphal bridges common in hyphal loops, small diameter hyphae within larger hyphae not uncommon. Monilioid cells relatively thin-walled (to 0.5 µm thick), subhyaline to pale brown, containing large oil globules up to 13 µm in diam in senescent cells.

Holotype: Dried culture derived from an isolate by K.N. Egger (K.N.E. 1126-ps) obtained from fresh ascospores, 8.5.1984, British Columbia, Canada, CUP 61608. (Isotypes in K, PRM, S.) Living cultures maintained at ATCC (#58709), CBS (#239.85), DAOM (#191895), IMI (#294727), and in the culture collection of Dr. G.C. Adams, Michigan State University, East Lansing, MI.
Paratypes: CUP 61616 (from K.N.E. 971-ps, isolated from fresh ascospores by K.N. Egger), British Columbia, Canada, 1983; CUP 61617 (from K.N.E. 1132-ss isolated from fresh ascospores by K.N. Egger), British Columbia, Canada, 8.5.1984. Isoparatypes are also deposited at C, DAOM, and NY.

6. ASCORHIZOCTONIA OCHROLEUCA Yang & Korf, sp. nov.

Ab **A. praecoci** *et taxis affinibus et ab* **A. groenlandica** *coloniis griseo-brunneis, mycelio circulis hyphalibus carente, et annulis concentricis post unam hebdomadem absentibus inconspicuisve, sed annulis 3 conspicuis sporodochiorum et congerierum hypharum supra agarum post 5 hebdomades in agaro +* **Solani tuberosi** *dextroso se explicantibus, differens.*

Holotypus: Norvegia, S. Sivertsen & H. Dissing, CUP 61607 (ex C.S.Y. 102-ps).
Teleomorphosis: **Tricharina ochroleuca** *(Bres.) Eckblad.*

Colonies fast spreading, concentric bands inconspicuous initially, becoming three bands on aged PDA plates (FIG. 8d). Mycelium hyaline on WA to grayish brown on PDA, appressed and immersed without monilioid cells aggregates on 5-wk old WA plates, mostly appressed and immersed but with visible aerial, pale brownish hyphae, and producing monilioid cell aggregates ("sporodochia") on CMA, MEA, and PDA, the three concentric bands formed by hyphal aggregates and monilioid cell-chains on agar. Hyphae cylindrical, simple-septate hyaline to pale brown, smooth, 2.0-9.5 µm broad, with right angle branching, containing oil globules usually smaller than 4.0 µm in diam; delimiting septum 4-5 µm into the branch or at the junction. Monilioid cells subhyaline to pale brown, limoniform, subglobose, or globose, 18.7-28.0 (-35.0) µm broad, containing large oil drops 11.0-16.8 µm in diam in senescent cells.

Holotype: Dried culture derived from an isolate (C.S.Y. 102-ps) from a specimen collected in Norway 18.8.1979 by S. Sivertsen and H. Dissing, ex Herb. C, MO 79.76, CUP 61607. (Isotypes in K, PRM, S.) Living cultures maintained at ATCC (#58710), CBS (#238.85), DAOM (#191896), IMI (#294726), and in the culture collection of Dr. G.C. Adams, Michigan State University, East Lansing, MI.

Paratypes: CUP 61620 (from C.S.Y. 105-ps) and CUP 61621 (from C.S.Y. 106-ps), both isolated from Dissing GR-83-107, Greenland, 7.8.1983, ex Herb C. Isoparatypes are also deposited at C, DAOM, and NY.

7. ASCORHIZOCTONIA PRAECOX Yang & Korf, sp. nov.

Coloniae griseo-brunneae post 5 hebdomades in patellis **Solani tuberosi** *dextrosum continentibus; circuli hyphales vulgares; annuli concentrici et in agaro +* **Solani tuberosi** *dextroso et in agaro + hordei tosti extracto post unam hebdomadem formati, annuli post 5 hebdomades obscurati.*

Holotypus: Norvegia, H. Dissing & S. Sivertsen, CUP 61609 (ex C.S.Y. 95-ps).

Teleomorphosis: **Tricharina praecox** *(Karst.) Dennis var.* **praecox.**

Mycelium fast growing, covering 90 mm petri plates of four media in 5-7 da, forming several conspicuous bands on 1-wk old MEA and PDA plates, becoming less clear on aged PDA plates (FIG. 8c). Mycelium appressed and immersed on WA, CMA, and MEA, hyphal loops present on WA and CMA; mycelium from hyaline on WA to brown on PDA, reverse brown to dark brown on PDA, with abundant aerial hyphae. Hyphae on all media (2.0-) 4.0-13.0 µm broad, simple-septate, hyaline and smooth, or brownish and smooth to slightly verrucose, wall 0.5-2.0 µm thick, cells filled with oil globules and minute organelles. Hyphae branching at a right or acute angle, with delimiting septum (0-) 2-5 (-7) µm into the branch. Hyphal loops formed by coiling, hyaline hyphae 2-4 µm broad, hyphal bridges common in the loops; small diameter hyphae within larger hyphae common. Monilioid cells thin-walled, brownish to brown, limoniform to subglobose, containing oil globules which may fuse into larger oil drops in senescent cells.

Holotype: Dried culture derived from an isolate (C.S.Y. 95-ps) from a specimen collected in Norway 17.8.1979 by H. Dissing and S. Sivertsen, ex Herb. C, HD & SS 79-63, CUP 61609. (Isotypes in K, PRM, S.) Living cultures maintained at ATCC (#58711), CBS (#240.85), DAOM (#191894), IMI (#294728), and in the collection of Dr. G.C. Adams, Michigan State University, East Lansing, MI.

Paratypes: CUP 61613 (from C.S.Y. 86-ps), isolated from B. Spooner, 15.4.1984, England, ex Herb. K; CUP 61614 (from C.S.Y. 94-ps), isolated from S. Sivertsen, 16.8.1978, Norway, ex Herb. TRH; CUP 61616 (from C.S.Y. 103-ps), isolated from S. Sivertsen and H. Dissing MO-79.56, 17.8.1979, Norway, ex Herb. C. Isoparatypes are also deposited at C, DAOM, and NY.

D. Cultural characteristics and generic description of **Complexipes**.

Four isolates were obtained by germinating herbarium specimens (TABLE 2), and several other isolates of E-strain fungi, of **Tricharina mikolae**, and of a new tetrasporous variety of **T. mikolae** were obtained from Dr. Hugh E. Wilcox, College of Environmental Science and Forestry, State University of New York, Syracuse, NY. His were cultured either by germinating fresh ascospores or by isolation from pine roots.

Most isolates grown on either MMN or PDA plates are slow-growing and often form restricted colonies (FIG. 9). A few isolates, notably C.S.Y. 14-ps of **T. mikolae** (Yang and Wilcox, 1984) and R-947 isolated from pine roots (Danielson, 1982), were relatively fast-growing and could cover a 90 mm petri dish in 3 wk. Growth rates were not measured. In an earlier study several **Complexipes** cultures isolated from mycorrhizal pine roots or obtained by germinating chlamydospores from coniferous nursery soils showed large variations in growth behavior on different media and at different temperatures (Wilcox et al., 1983).

The mycelia on both MMN and PDA media are similar in morphology except those on PDA turned the agar brown. Some isolates (C.S.Y. 91-ps, 92-ps) produce hyphal ropes on PDA while others do not form similar structures (FIG. 9). The hyphal ropes are composed of intercalary chlamydospores in chains, and often produce short, lateral branches. The chlamydospores are brown, thick-walled, and contain oil globules of various sizes. The oil globules are usually less than 3.5 µm in diam in young chlamydospores, but become larger oil drops up to 15 µm in diam in mature chlamydospores. Hyphae of all isolates are from hyaline to brown, simple-septate, smooth to verrucose, with occasional intercalary chlamydospores. The breadth of the cylindrical hyphae ranges from 2 to 12 µm.

Terminal chlamydospore production and chlamydospore sizes are inconsistent, depending upon fungal strains and nutrient media. Some isolates produce abundant terminal chlamydospores on certain media but not on others (Yang & Wilcox, 1984). A few isolates studied do not produce terminal chlamydospores at all on PDA (TABLE 4). Intercalary chlamydospores are, however, present in all isolates examined in this study.

Terminal chlamydospores are initiated from aerial hyphae extending from the agar surface, or from hyphae branching from aerial hyphae. They are subhyaline with a few ornamentations (FIG. 10) on the spore surface and become brown and covered with many fine surface ornamentations (FIG. 11).

Because of inconsistency in chlamydospore production and in

Table 4. Terminal chlamydospore production of Complexipes spp. on two artificial media.

Teleomorph[1] and herbarium no.	Culture no.	Terminal chlamydospore production	
		MMN	PDA
Tricharina mikolae, BPI 71929	C.S.Y. 4-ss[2]	yes	yes
T. mikolae, BPI 71929	C.S.Y. 14-ps[2]	yes	yes
T. mikolae, BPI 71929	C.S.Y. 19-ss	yes	yes
T. mikolae, BPI 71929	C.S.Y. 25-ps	yes	yes
T. mikolae (tetrasporous variety)[3], CUP 59893	C.S.Y. 44-ps	?[4]	yes
T. mikolae (tetrasporous variety)[3], CUP 59893	C.S.Y. 50-ss	?	no
T. mikolae (tetrasporous variety)[3], CUP 60628	C.S.Y. 57-ps	?	yes
T. mikolae (tetrasporous variety)[3], CUP 60628	C.S.Y. 81-ps	?	yes
T. mikolae, CUP 60689	C.S.Y. 91-ps	?	yes
T. mikolae, CUP 60689	C.S.Y. 92-ps	?	yes
new taxon[5], TRH 19-9-1974	C.S.Y. 85-ps	?	no
new taxon[5], CUP-MM 1421	C.S.Y. 100-ps	?	no

1. Yang and Korf (1985) propose a new genus to include these isolates.

2. ss = single-spore isolate; ps = polyspore isolate.

3. Yang and Korf (1985) erect a new variety for this taxon.

4. ? = not tested.

5. Yang and Korf (1985) erect a new species for these two collections.

size, in wide range of mycelial morphology, and in the major variations noted in shape, size, and distinctiveness of ornamentations on hyphae and on chlamydospores, without corresponding correlations between anamorphs and teleomorphs, no specific epithets have been assigned to the **Complexipes** isolates studied here. A monograph of **Complexipes** is beyond the scope of these investigations.

COMPLEXIPES Walker, Mycotaxon 10: 99. 1979, **emend.** Yang & Korf

Colonies slow-growing to medium fast-growing on either MMN or PDA, colonies restricted or covering 90 mm petri plates in 3-4 wk or longer; mycelium light brown to brown, turning PDA medium dark brown, immersed and floccose; hyphae single or producing chlamydospores in chains and aggregated into rope-like structures (FIG. 9) in agar, cylindrical hyphae frequently septate, simple-septate, (erroneously originally described as non-septate), hyaline to brown, smooth to verrucose; terminal chlamydospores present or not, intercalary chlamydospores common, subglobose to globose, subhyaline initially (whitish under the dissecting microscope), then turning brown, often with fine ornamentations consisting of subspherical to finger-like projections on the spore surface; terminal chlamydospores (FIGS. 10, 11) attached to a subtending hypha of one to more than ten cells; subtending hyphae brownish to brown, verrucose, with constrictions at the septa.

Holotype: **Complexipes moniliformis** Walker, Mycotaxon 10: 99. 1979; the holotype specimen (one slide) from OSC and an apparent isotype (one slide) at ISC were examined earlier by the senior author while a student at College of Environmental Science and Forestry, State University of New York, Syracuse, NY.

Notes: Walker (1979), when erecting the genus to accommodate some chlamydospores collected from soils of a pine plantation, assigned his genus tentatively to the Endogonaceae and indicated that the hyphae were "coenocytic" and "non-septate." Walker's two slides clearly show **C. moniliformis** to be a member of the so-called "E-strain" mycorrhizal fungi. The spores are attached to septate subtending hyphae and septate vegetative hyphae. "E-strain" fungi were recently shown to have a **Tricharina** teleomorph (Yang & Wilcox, 1984). Since these fungi are culturable on various nutrient media, the genus is here emended and removed from the Endogonaceae, and assigned to the Agonomycetales.

DISCUSSION AND CONCLUSIONS

The genus **Tricharia** was erected by Boudier (1885) to accommodate some small, hairy Discomycetes with smooth, eguttulate ascospores. Because Boudier's generic name is a later homonym of **Tricharia** Fée, **Tricharina** Eckblad (1968) was erected to replace it. Herbarium specimens assigned to **Tricharina**, when germinated and brought into culture, are clearly divisible into two groups.

The first group has **Rhizoctonia**-like anamorphs. One of these anamorphs, **Rhizoctonia hiemalis**, was demonstrated to produce a teleomorph assigned to **Trichophaea** Boud. by Whitney and Parmeter (1964) and by Warcup and Talbot (1966). Apothecia obtained by Warcup and Talbot and deposited at Kew by Talbot are actually of **Tricharina**. Because of the conventional **Rhizoctonia**-Basidiomycete connections (Parmeter, 1970; Tu and Kimbrough, 1978), a new genus, **Ascorhizoctonia**, is erected to encompass the **Rhizoctonia**-like anamorphs of **Tricharina**. Six new taxa are described in the genus with one new combination, **A. hiemalis**.

Although two collections assignable to **Tricharina** were previously cultured by Gamundí (1966) and Paden (1972), neither collection has been reexamined. Gamundí's specimen was reported as **Trichophaea fimbriata** (Quél.) Gamundí, and the culture was studied by her on four media, none of which were used in this study. From her description and illustrations, the species is presumably a **Tricharina** with the anamorph in **Ascorhizoctonia**. Since the specimen is no longer available and the culture studies were done on different media, no direct comparisons can be made here. The culture obtained by Paden did not produce conidia (Paden, 1972). It was quite fast-growing, and formed brownish, dense colonies, and the specimen (Paden #625) is apparently identical with the teleomorph of **Ascorhizoctonia intermedia** (K.N. Egger, personal communication).

The second group of **Tricharina** species yields **Complexipes** or "E-strain" anamorphs (Wilcox et al., 1974; Walker, 1979; Danielson, 1982; Yang & Wilcox, 1984). The genus **Complexipes** was described for some **Endogone**-like chlamydospores collected from soils from a pine plantation in Iowa (Walker, 1979). The senior author, after examining Walker's type specimen, is convinced that **Complexipes** and "E-strain" fungi are congeneric. Because "E-strain" fungi can be easily isolated from roots and from chlamydospores, and brought into culture, the genus **Complexipes** Walker is emended to include both cultures derived from roots or chlamydospores and those derived from ascospores of certain **Tricharina** species.

The two groups noted in **Tricharina** not only have distinct anamorphs, but also differ in mode of ascospore germination. Ascospores of those yielding **Ascorhizoctonia** germinate quickly after being placed on germination agar. Germ tubes are cylindrical and elongate rapidly. Ascospores of those yielding **Complexipes** germinate much slower, and may produce a cross septum in the ascospore during germination. The germ tube elongates only slowly, mainly due to the production of chlamydospore-like cells in constricted chains. Only later do cylindrical hyphae extend from the chlamydospore-like cells. Germinating ascospores, germ tubes, chlamydospore-like cell-chains, and cylindrical hyphae all richly contain oil droplets.

Ecological niches of the two groups may also be different. Several cultures of **Complexipes** ("E-strain" fungi) have been experimentally demonstrated to be mycorrhizal with pinaceous conifers (Wilcox et al., 1974; Thomas and Jackson, 1979; Danielson, 1982; Wilcox et al., 1983; Yang & Wilcox, 1984). On the other hand, **Ascorhizoctonia** has never been shown to have any mycorrhizal association. Although **A. hiemalis** was isolated from soil of a pine plantation, no pathogenic effects were shown when it was inoculated to several plant species in sterile conditions or in soils (Saksena and Vaartaja, 1961). Mycorrhizal synthesis with red pine seedlings in flask cultures with an isolate of this fungus (ATCC #14016) failed to show any mycorrhizal formation (Yang and Wilcox, unpublished data). It is likely that **Ascorhizoctonia** species are saprophytes in soils.

The two groups existing in the genus **Tricharina**, though both have apothecial features fitting very well into the definition given by Boudier (1885, 1907), should be separated into two independent genera on the basis of different anamorphs, different modes of ascospore germination, differences in apothecial structures, and perhaps different ecological niches. The genus **Ascorhizoctonia** is associated with **Tricharina**, because the lectotype (Clements and Shear, 1931) of **Tricharina**, **T. gilva**, yields an **Ascorhizoctonia** anamorph. Those species currently assigned to **Tricharina** but yielding **Complexipes** anamorphs should be segregated into a different genus, which we are publishing separately (Yang & Korf, 1985).

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A TAXONOMIC REVISION OF THE GENUS SOWERBYELLA NANNFELDT (DISCOMYCETES, PEZIZALES)

JIŘÍ MORAVEC

Sadová 21/5, č. 336, 679 04 ADAMOV u Brna, Czechoslovakia

ABSTRACT

Three new species, **Sowerbyella crassisculpturata, S. polaripustulata,** and **S. densireticulata** are described on the basis of differences in ascospore ornamentation. Many collections of **Sowerbyella,** including the type specimen of the reticulate-spored type species, **S. radiculata,** were examined. Ascospore ornamentation of the three new speciesand of **S. fagicola, S. imperialis,** and **S. radiculata** is illustrated in line drawings and SEM photomicrographs. **S. bauerana** is a synonym of **S. radiculata.**

INTRODUCTION

The genus **Sowerbyella** Nannfeldt (1938) proposed for **Peziza radiculata** Sowerby (1797) and **Aleuria unicolor** Gillet (1880) as a segregate from the heterogeneous **Pseudotis** (Boud.) Boud. has generally been adopted. I consider the genus **Sowerbyella** a very natural genus of the tribe Sowerbyelleae Le Gal emend. Korf of the subfamily Otideoideae Korf, family Pyronemataceae Corda emend. Korf according to the classification of Korf (1972). There are certain features, however, that show a relationship to the genus **Aleuria** Fuck.

For a long time only the two species, **S. radiculata** (Sow.) Nannf. and **S. unicolor** (Gill.) Nannf. were known, and **Sowerbyella** was considered a "small" genus. Korf (1972), however, mentioned that at least two more as yet undescribed species were found in North America. He earlier (Korf, 1971) had transferred **Peziza imperialis** Peck (1878) to the genus on the basis of his examination of the type, and considered it identical to the later described **S. unicolor.** Another species, **S. fagicola** J. Moravec (1973) was described from a single collection in Moravia, Czechoslovakia. Recently Harmaja (1984) described another species closely related to **S. imperialis** (Peck) Korf under the name **S. brevispora** Harmaja. It appears clear that **Sowerbyella** may be a large genus with a number of closely related but distinct species. My examination of specimens deposited in herbaria has confirmed that there are more as yet undescribed species of the genus. Many had been determined merely superficially on macroscopic features, or have been confused with **S. radiculata.**

MATERIALS AND METHODS

Specimens of **Sowerbyella** were examined from the following herbaria: Herbarium of the National Museum, Prague (PRM); Herbarium of the Moravian Museum, Brno (BRNM); Herbarium of the Slovakian National Museum, Bratislava (BRA); Herbarium of the Royal Botanic Gardens, Kew (K); private herbarium of Dr. W. D. Graddon, Ross-on-Wye, Great Britain (W.D.G.), and my own herbarium (J.Mor.).

A few collections were examined in the fresh state, but most specimens were examined dried. Studies on ascospore ornamentation were made on dried material revived in 4% aqueous NH_4OH. Sections of revived apothecia were stained in Cotton Blue in lactic acid and the perispore ornamentation observed with an oil immersion objective at a magnification of X1600. At least 500 ascospores of each collection were observed and all slides simultaneously compared with slides of type specimens. The perispore ornamentation of ascospores in each collection was studied in greater detail for several hours, and the variability was critically compared, described, and illustrated. All measurements were done under the oil immersion objective. A scanning electron microscope, Telsa BS 300, was used and scanning electron micrographs (SEM) were taken from dried material according to the method of Harmaja (1976).

TAXONOMIC RESULTS

I have reexamined the type specimen of the type species of the genus, **S. radiculata**, through the kindness of Dr. B.M. Spooner, Kew, who sent me part of the type from Herb. K. The ascospores of this specimen have **reticulate** sculpturing (Figs. 1, 7-10), complete or incomplete, and even though the ornamentation is rather variable, no ascospore at maturity is entirely warted.

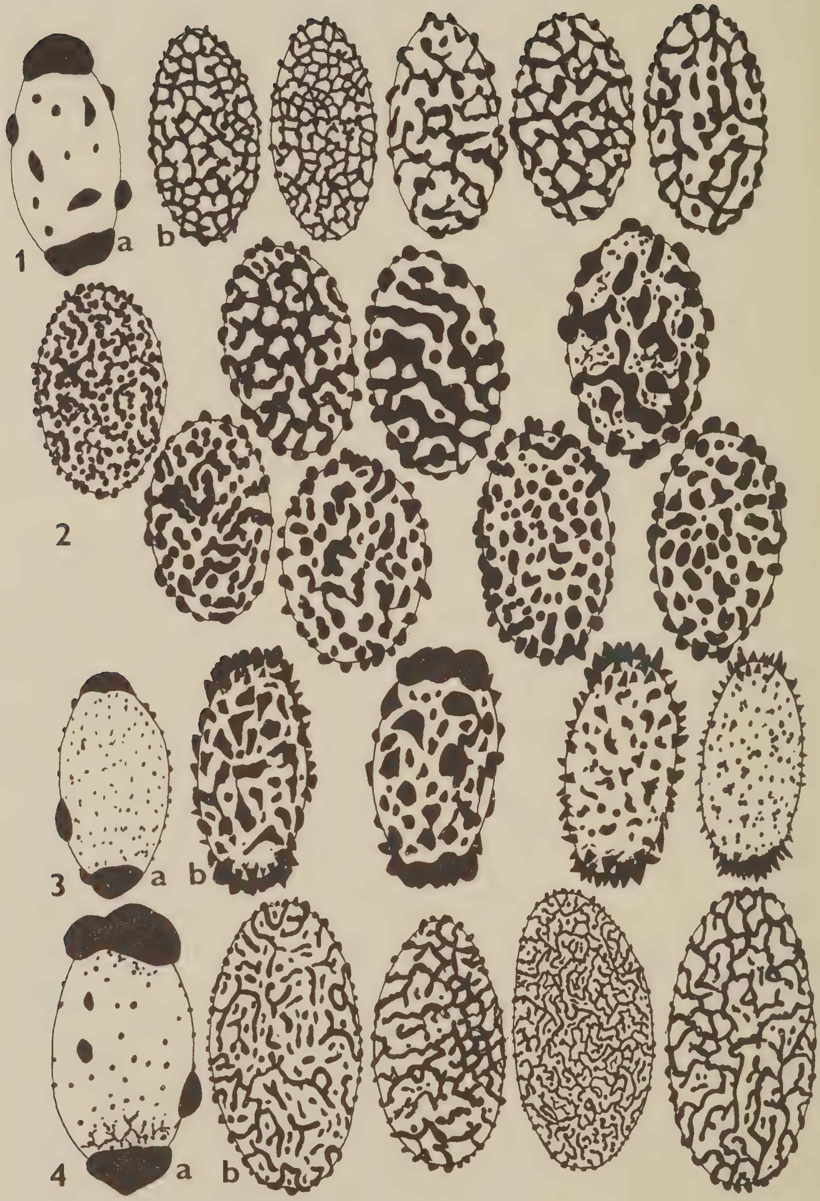
The type species, **S. radiculata**, has generally been considered a discomycete with warted ascospores. This was the result of the use of insufficient optics and outdated staining methods. Thus Cooke (1876a), Phillips (1887), and Boudier (1885, 1905-1910, 1907) described the ascospores as asperate or finely warted, and Velenovský (1934) described them as "grosse verrucosae." Nannfeldt (1938) also reexamined the type of **Peziza radiculata** and described the ascospores as verrucose. This concept has been adopted by many recent mycologists, among them Eckblad (1968), Dennis (1978), and J. Moravec (1973).

The ascospores of **S. radiculata** are 12-16.5 X 6-8.2 μm, and the ribs of the reticulum are 0.4-0.7 (-1.2) μm thick and 0.2-0.5 (-0.7) μm high. The ascospores of the type agree well with those of six other collections I have examined, found in Czechoslovakia and Sweden. I have examined all apothecia of each individual collection of S. **radiculata** and each of them has the same type of reticulate ascospore.

Other collections, from England and Czechoslovakia, with coarse, rounded warts on the ascospores, generally confused with this species, are described here as a new species, **S. crassisculpturata**. One other collection from Bohemia in my herbarium, which I had previously examined in the fresh condition, is described here as another new species, **S. polaripustulata**, also on the basis of ascospore ornamentation. A third new species, **S. densireticulata**, characterized by larger, densely reticulate ascospores, is described from several Czechoslovakian collections.

I have reexamined the ascospores of the type specimen of **Peziza bauerana** Cooke (1876b) from a slide with a section of a mature apothecium kindly sent to me by Dr. B.M. Spooner (K). This species was considered identical with S. **radiculata** by Nannfeldt (1938), but recently Harmaja (1984) transferred it to **Sowerbyella** as an independent species, S. **baurana** (Cooke) Harmaja. Presumably Harmaja had not examined the type of S. **radiculata**, as he distinguished S. **bauerana** on the basis of reticulate ascospores. The reticulate ornamentation on the ascospores of S. **radiculata** and P. **baurana** are identical, and Cooke's species thus falls into synonymy with that of Sowerby. This is also the opinion of Dr. Spooner (in litt.). I have not examined any material of **Peziza (Sarcoscypha) radiculata** var. **percevalii** Phillips apud Cooke (1877). Dr. Spooner has sent me his excellent camera lucida drawings of the ascospores of the type, since the type material at Kew is very scanty. The drawings clearly show the same reticulate ascospore sculpturing as in S. **radiculata**, and we consider this variety, originally described and distinguished by its split apothecia, conspecific. Similarly the type of **Geopyxis cookei** Massee (1895) has the same size and reticulation of ascospores (according to Dr. Spooner's letter to me after his reexamination of the type), and represents another synonym of S. **radiculata**. It confirms the opinion of Nannfeldt (1938), too. As indicated by Nannfeldt (1938), no specimens of **Peziza geochroa** Pers., P. **retirugis** Fr., or P. **lepidota** Fr., which he treated as synonyms of S. **radiculata**, exist in Persoon's or Fries's herbaria. **Peziza pateraeformis** Dur. & Lév. was not examined by Nannfeldt (1938) though also placed in synonymy, and I have had no opportunity to see a specimen of this fungus which was transferred to **Pustularia** by Boudier (1907). According to Svrćek (1982) **Otidea reisneri** Velenovský (1920, 1934) is a synonym of S. **radiculata**, based on the description only. It is not known where the type material is deposited, if it exists. In my opinion it differs in macroscopic and microscopic features from **Sowerbyella**. Velenovský noted that it was similar to **Otidea leporina**, and described the ascospores as 15-20 µm long and smooth. It is not possible to determine this fungus without a reexamination of the type, which seesm to be lost.

Sowerbyella imperialis (Peck) Korf, more commonly known as S. **unicolor**, represents a fungus which has much brighter orange-yellow apothecia with a yellow external surface. Some specimens, however, when dried resemble S. **radiculata**. I measure the ascospores 12-14.3 X 6-6.7-7.5 µm. I have found that the warts of the perispore are not only isolated as described by Heim (1961) and Svrćek (1969), but that they often anastomose and in a certain number of ascospores even form an incomplete reticulum as illustrated by Le Gal (1947) and by Breitenbach & Kränzlin (1981), but I have found it much denser and slightly coarser (Figs. 5, 18, 19). This has been shown in SEM, too. The warts are often enlarged and spine-like on the ascospore poles. I have examined a specimen of this fungus from Germany: In "Nagelberg" near Treutchtlingen, on decayed leaves of **Fagus** in a mixed forest, 12.IX.1976, leg. Rudolf Wilke (BRD). My illustrations and SEM micrographs are made from this specimen. I have also examined a specimen from Switzerland recorded by Svrćek (1969). I have been unable to examine the specimen of **Geopyxis cupularis** sensu Velenovský (1934) which was determined as S. **unicolor** by Svrćek (1982), nor have I examined the type of **Peziza imperialis** Peck (1878), but I accept Korf's (1971) concept of this species as identical to S. **unicolor**, as


1
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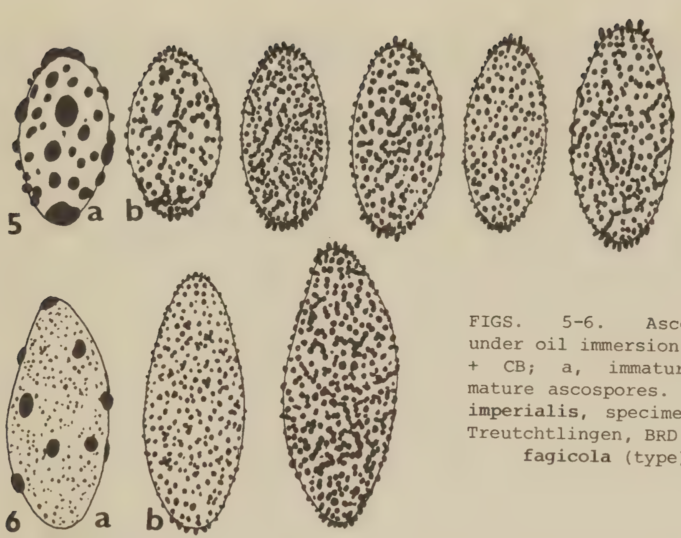


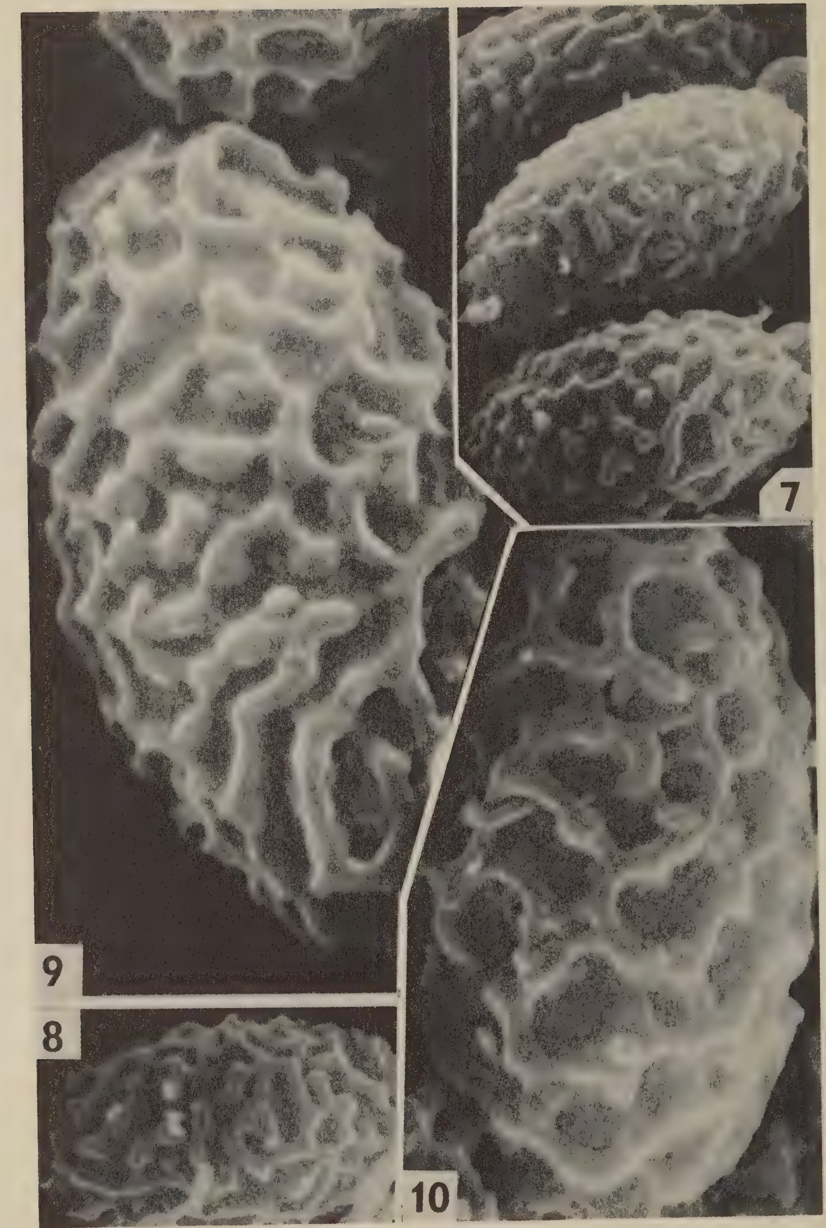
FIGS. 5-6. Ascospores under oil immersion, 1600X + CB; a, immature; b, mature ascospores. 5. **S. imperialis**, specimen from Treutchtlingen, BRD. 6. **S. fagicola** (type).

did Pfister (1979). Nevertheless, Peck described the ascospores as 10 x 5 µm, so it may represent a different species. I also have not examined the type of S. **brevispora** Harmaja (1984), which also has small ascospores, but Harmaja has described and illustrated isolated warts on the ascospores. Such isolated ornaments are unusual, and would differentiate this species. An ascospore ornamentation similar to that in S. **imperialis** can be found also in ascospores of S. **fagicola**. This species, known only from the type locality, differs from S. **imperialis** especially in ascospore size and shape (J. Moravec, 1973), with ascospores 15-19.5-20.5 X 7-8 µm (Figs. 6, 20). SEM clearly shows the variability of ascospore ornamentation.

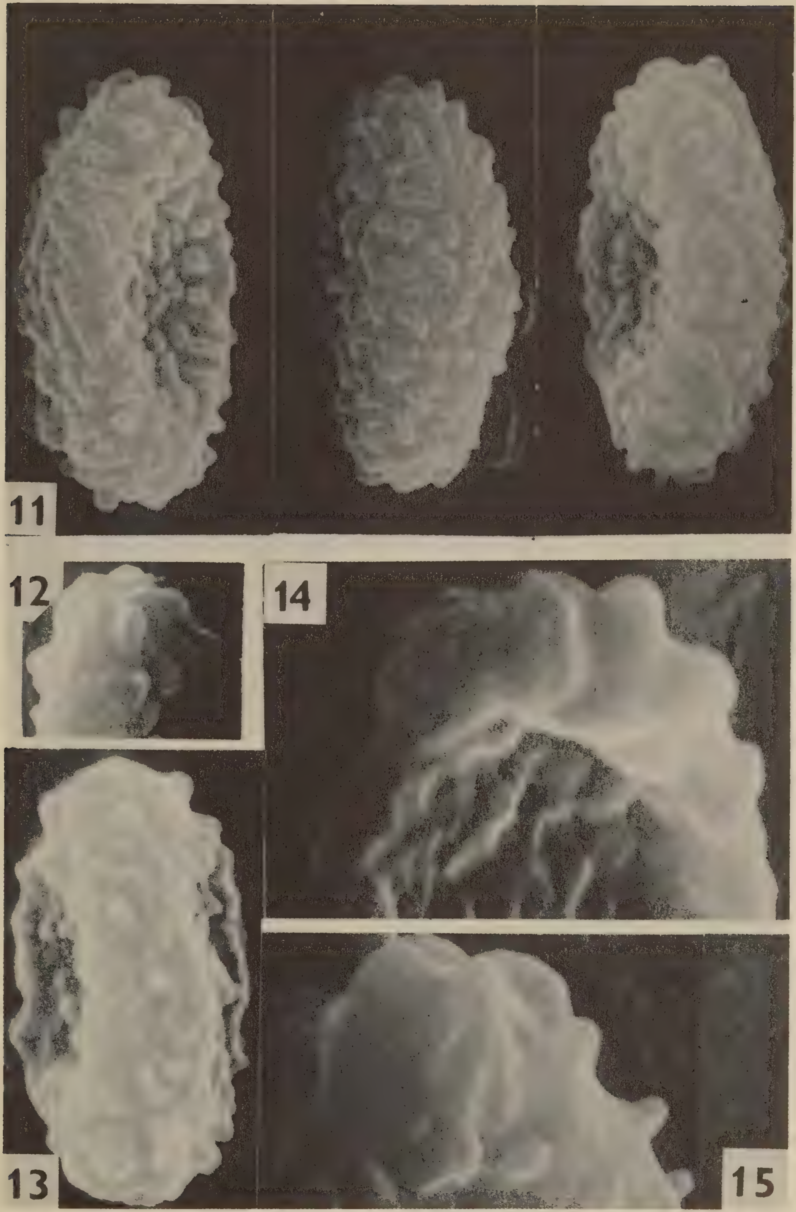
The seven accepted species of **Sowerbyella** are closely related to each other, having the same origin for spore ornamentation, similar anatomy, and similar macrofeatures. Certain differences in macrofeatures, anatomy, including the thickening of the wall in apothecial hairs, must be revised after additional collections have been examined, especially in the fresh state.

Ascospore ornamentation in all species of **Sowerbyella** is of perisporal origin. Immature ascospores, within asci, of all six species of **Sowerbyella** examined, are similar - the perispore bears small, isolated warts and very large, strongly cyanophilic pustules distributed especially at the poles. The perispore is peelable. Very similar perispore ornamentation of mature ascospores occur in a

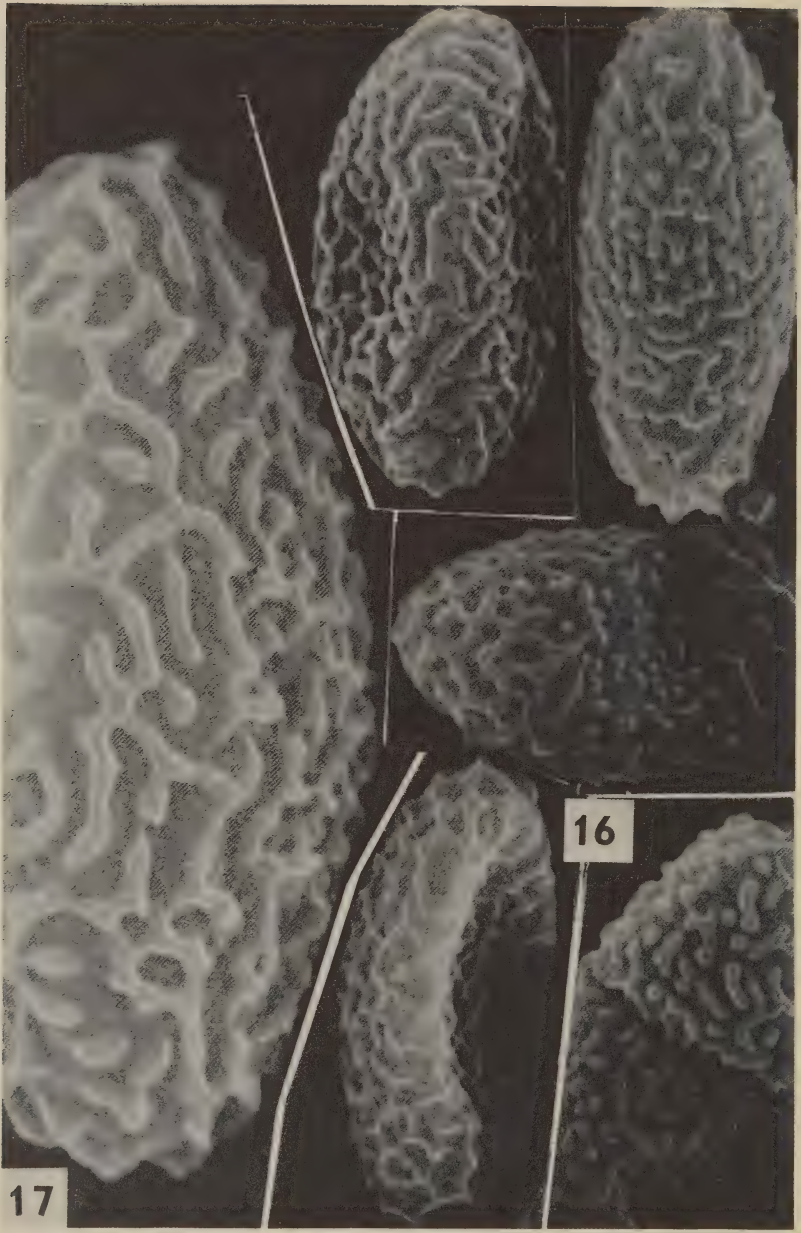
FIGS. 1-4. Ascospores under oil immersion, 1600X + CB; a, immature; b, mature ascospores. 1. **Sowerbyella radiculata** (type). 2. **S. crassisculpturata** (type). 3. **S. polaripustulata** (type). 4. **S. densireticulata** (type).



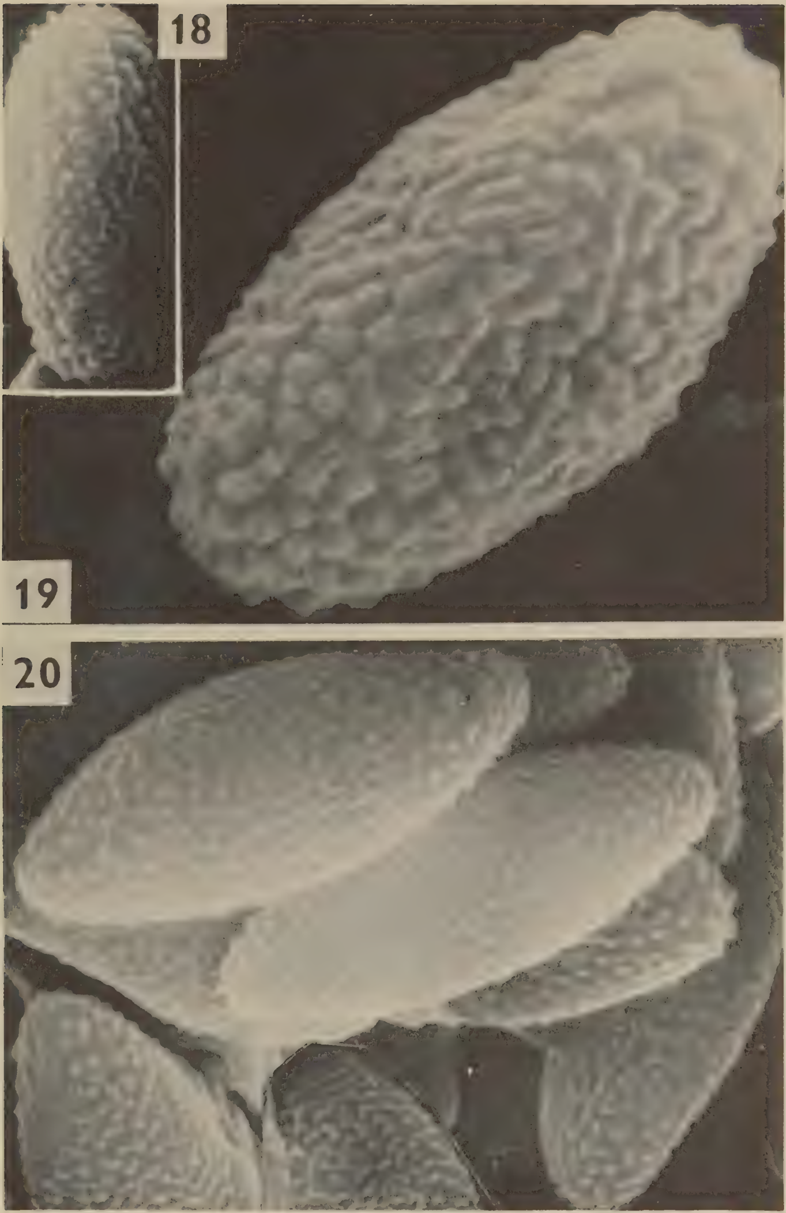
FIGS. 7-10. SEM of ascospores of the type of **S. radiculata**. 7-8, X5000; 9-10, X10,000.



FIGS. 11-15. SEM of ascospores. 11. **S. crassisculpturata** (type), X5000. 12-15. **S. polaripustulata** (type). 12-13, X5000; 14-15, X10,000. (FIGS. 12, 14, 15 are parts of ascospore poles.)



FIGS. 16-17. SEM of ascospores of **S. densireticulata** (type). 16, X5000
17, X10,000.



FIGS 18-20. SEM of ascospores. 18-19. S. **imperialis** (specimen from Treutchtlingen, BRD). 20. S. **fagicola** (type). 18, 20, X5000; 19, X10,000.

certain number of ascospores of all species. Despite this variability, the majority of mature ascospores differ clearly in each individual species. These differences are great, essential, and constant in all collections examined. All apothecia of any one collection have ascospores with the same ornamentation. Thus, all species can be easily determined. Moreover, several species have significantly different ascospore sizes. Recognizing more species in the genus **Sowerbyella** proved to be quite natural, and an analogy can be drawn to some other genera.

The following three species are described as new, based on the differences noted in the descriptions.

SOWERBYELLA CRASSISCULPTURATA J. Moravec, **spec. nov.** (Figs. 2, 11)

Apothecia 15–40 mm diam., solitaria vel gregaria et caespitosa, substipitata vel stipitata, irregulariter cupulata, saepe depressa, margine primum involuta dein irregulariter lobata et rare ad basi incisa; thecio laete luteo vel vitellino, usque luteo-aurantio, exsiccato laete badio; pars externa apotheciorum rugosa, laete ochracea vel alba, subtiliter albo tomentosa. Stipes 5–9 mm crassus, basi radiciformibus, 10–40 mm longus incl. radix, tomentosus, substrato et mycelio involutus. Excipulum externum textura globulosa angularis, cellulis 8–30–40 µm diam., cum pilis externis hyphoideis, usque 350 µm longis, 8–15 µm crassis, tunica 01.–0.6 µm crassa; parte inferiore (medulla) textura intricata e hyphis 8–14 µm crassis, saepe inflatis, septatis, cum cellulis globosis, parvis, mixta. Paraphyses filiformes, rectae, vel saepe paulum curvatae, septatae, usque 3 µm crassae, apice sensim dilatatae (3.5 µm) laete subluteolae. Asci 150–190 X 9.5–10.2 µm, octospori. Ascosporae 13.5–15–16.5 X 7.5–9.7 (–10.5) µm, late ellipsoideae, guttulis binis instructae; perisporio verrucoso vel incompleto-subreticulato, costis crassis, irregularibus, isolatis vel anastomosibus, 0.3–1.5 (–2.5) µm crassis sed saepe perisporio solum verrucoso, verrucae isolatae, orbiculares, 0.5–2.5 µm diam. et 0.5–1.2–1.6 µm altae. (Oil immers. 1600X + CB et SEM.)

Species **Sowerbyellae radiculatae** similis, sed ascosporibus verrucosis differt.

Habitat: Moravia merid.: obp. Líšeň prope Brno, in silva mixta (**Picea, Pinus, Quercus, Abies**) solo humoso, 26.ix.1976 leg. Alois Vágner. Holotypus in BRNM (n^{o} 312328) asservantur.

Apothecia 15–40 mm diam, scattered or gregarious and caespitose, with a short to long stipe, irregularly cupulate or shallowly cupulate, often depressed, margin involute, then irregularly lobed, rarely incised or split downwards, hymenium bright yellow or vitelline to yellow-orange, pale bright brown in dried specimens, ectal surface rugulose, pale ochraceous or whitish, with a fine, appressed, white tomentum. Stipe 5–9 mm thick, attenuated to a short to long root-like prolongation buried in substrate, covered with a hypostroma and wrapped with soil particles and substrate, 10–40 mm long (including the root-like part). Ectal excipulum of textura globulosa-angularis, cells 8–30–40 µm diam. Hairs of the ectal surface numerous, hypha-like, up to 350 µm long, 8–15 µm wide, septate, wall 0.1–0.6 µm thick. Inner medullary layer of a textura intricata composed of septate, often inflated hyphae mixed with small, globular cells. Hypothecium composed of small, irregular, hypha-like cells. Paraphyses filiform (3 µm), straight or often slightly curved and very slightly enlarged above (3.5 µm), pale yellowish. Asci 150–190 X 9.5–10.2 µm, cylindrical, 8-spored, non-amyloid. Ascospores 13.5-15-16.5 X 7.5-9.7 (-10.5) µm, ellipsoid to broadly ellipsoid, containing two guttules, perispore at maturity coarsely verrucose or with an incomplete, coarse reticulum, isolated or anastomosing rib-like warts, 0.3-1.5-2.5 mm diam and 0.5-1.2-1.6 mm high. (Oil immers., 1600X + CB, and SEM.)

Habitat: Czechoslovakia, Moravia merid.: Líšeň near Brno, in a mixed forest (**Picea, Pinus, Abies, Quercus**) on humus, 26.ix.1976, leg. Alois Vágner. Holotype in the Herbarium of the Moravian Museum, Brno, BRNM (n° 312328).

Other specimens examined: Czechoslovakia, Moravia: Líšeň, loc. "Gottwaldovo údolí" near Brno in a wood sub **Picea**, 24.x.1982, leg. J. Dubová (Herb. J.Mor.); Líšeň near Brno, x.1982, two collections, collector unknown (J.Mor.); Bohemia: Karlštejn loc. "Vodopády," 3.x.1965, leg. Dr. Jiří Kubička, (PRM 610835); Loděnice prope Beroun, in a wood of **Picea**, 26.x.1958, leg. Dvořák (PRM 614615); England, Llangrove, Herfordshire, in a sandy hedgebank, November 1984, leg. W.D. Graddon (W.D.G. n° 1691).

Sowerbyella crassisculpturata is a species macroscopically very similar to S. **radiculata** but differs in ascospore sculpture. The perispore of a certain number of mature ascospores is subreticulate, but in the majority of ascospores is verrucose. It is probably more common in Europe than S. **radiculata**. Maas Geesteranus (1967) and Graddon (1976) identified this species as S. **radiculata**. The dried apothecia of this species, as well as those of S. **radiculata**, have the typical smell of **Lactarius helvus**.

SOWERBYELLA POLARIPUSTULATA J. Moravec, spec. nov. (Figs. 3, 12-15)

Apothecia usque 40 mm diam., cupulata, margine integra vel sensim dentato subincissa, stipitata, thecio luteo ochraceo, subaurantiaco, pars externa apotheciorum laete ochracea, venoso-rugosa, basi albide tomentosa. Stipes usque 20 mm altus et 10 mm crassus, basi attenuatus et radiciformis. Excipulum externum textura globulosa-angularis, cellulis magnis, 14-50-70 µm diam.; pilis externis hyphoideis, usque 250 µm longis et 4-10.8 µm crassis septatis, tunica 0.2 µm crassa. Pars inferiore (medulla) textura intricata sed valde atypica, e cellulis elongato-ellipsoiideis (25-90 X 10-27 µm), granulis luteolis instruct., et hyphis inflatis, septatis constat. Paraphyses filiformes, rectae vel sensim curvatae, septatae, 2.7 µm crassae, apice sensim dilatatae (4 µm). Asci 190-220 X 9.6-11 µm. Ascosporae ellipsoideae, 13-15 X 6-7.5 µm (sine ornamento), guttulis binis instructae, spinosae-verrucosae, vel echinatae vel cum spinis et costis irregularibus, brevibus; verrucae ad poles sporarum magnae et spinis longiores. (Oil immers. 1600X + CB, et SEM.)

Ab alliis speciebus generis sporibus crasse spinoso-verrucosis et pustulis magnis ad polis sporarum differt.

Habitat: Bohemia. centr.: Karlštejn, loc. "Králova studna," ad terram in silva frondosa solo humoso, 29.ix.1968, leg. Dr. Kubička et J. Moravec. Holotypus in BRNM (n° 312327) asservantur.

Apothecia up to 40 mm diam, nearly regularly cupulate, margin only slightly incised, stipitate, hymenium yellow-ochraceous to yellow-orange, ectal surface pale ochraceous, venose rugulose, base whitish tomentose. Stipe up to 20 mm long and 10 mm thick, with a root-like base. Ectal excipulum of textura globulosa-angularis comprising large, subglobose cells 14-50-70 µm in diam, hairs of the ectal surface hypha-like, up to 250 μm long and 4-11 μm wide, septate, thin-walled, walls 0.2 μm thick. Inner medullary layer of very atypical textura intricata composed of elongated-ellipsoid cells (25-90 X 10-27 μm) with orange granules mixed with septate, mostly inflated hyphae. Paraphyses filiform, 2.7 mm wide, septate, straight or slightly curved above and only slightly enlarged (4 μm). Asci 190-220 X 9.6-11 μm, cylindrical, 8-spored, non-amyloid. Ascospores ellipsoid, 13-15 X 6-7.5 μm excl. ornamentation, containing two globules, at maturity coarsely warted to spine-like warted, or erinaceous; warts irregular or spine-like or short rib-like, 0.6-1.6-1 μm high and 0.5-2.5 μm wide, ascospore poles often covered with very large (to 3 μm diam), strongly cyanophilic pustules or with conspicuously elongated spines. (Oil immers. 1600X + CB, and SEM.)

Habitat: Czechoslovakia, central Bohemia: Karlštejn near a place "Karlova studna" on wet humus soil in a wood of deciduous trees, 29.ix.1968, leg. Dr. Jiří Kubička and Jiří Moravec. Holotype: BRNM (n° 312327).

Sowerbyella polaripustulata differs from other species of **Sowerbyella** especially in the ascospore sculpture which is quite different from that of S. **radiculata**. It differs from S. **crassisculpturata** by the coarser ascospore sculpture which never forms any reticulum, by the presence of the isolated spines or spine-like warts and the huge cyanophilic pustules on the ascospore poles. It is known from a single collection.

SOWERBYELLA DENSIRETICULATA J. Moravec, **spec. nov.** (Figs. 4, 16, 17)

Apothecia 0.7-30 mm diam., solitaria vel gregaria saepe regulariter cupulata, marginemque integre, dein patellaria, subsessilia vel stipitata, thecio laete luteo vel vitellino, pars externa apotheciorum subluteola, sublevis, albo subtiliter tomentosa (exsiccata aureo-luteo-fusco maculata). Stipes 5-9 mm crassus et 5-25 mm altus basi radiciformibus et attenuatus, semihypogaeus, mycelio albo et substrato involutus. Excipulum externum textura globulosa-angularis, cellulis 14-54 μm diam., pilis externis hyalinis, hyphoideis, saepe ramosis, usque 460 μm longis et 6.5-8 μm crassis, tunica 0.2 μm crassa; parte inferiore (medulla) textura intricata, e hyphis septatis, inflatis, 8-15 μm crassis constat. Paraphyses filiformes, usque 3 μm crassae, septatae, apice valde curvatae, usque 4 μm crassae et saepe irregulariter dentatae. Asci 190-220 X 10.8-12.2 μm, cylindracei octospori, sed saepe etiam 3-6 ascosporae maiores (usque 22 X 10 μm) in asco. Ascosporae 14-19.5 X 6.7-8.3-9 μm, inequaliter ellipsoideae, guttulis binis instructae, dense irregulariter incompleto-reticulatae. Reticulum e costis tenuis saepe dense locatis, 0.15-0.2-0.45-0.6 μm crassis et 0.1-0.45 μm altis et verrucis parvis, isolatis, saepe mixtis, ad polis saepe longis (usque 0.5 μm) constat. (Oil immers. 1600X + CB, et SEM.)

Ab aliis speciebus generis sporis maioribus et dense incompleto-reticulatis differt.

Habitat: Slovacia bor.: montes Vysoké Tatry prope Východná et Važec, 850 m., ad marginem silvae coniferarum in aciculis, 3.ix.1972, leg. Ing. Jan Kuthan. Holotypus: BRA (n° 01206).

Apothecia often very small, 0.7-30 mm diam, scattered or gregarious, regularly nearly cupulate with a continuous margin, then shallowly cupulate, subsessile to stipitate; hymenium bright yellow to vitelline, ectal surface yellowish, apparently smooth but with a very fine appressed tomentum, dried specimens with golden-yellow to reddish-orange spots. Stipe 5–9 mm thick, with an attentuated root-like base, 5–25 mm long (including the root-like prolongation), buried in the substrate, covered with wihitish hypostroma and wrapped with substrate. Ectal excipulum of textura globulosa-angularis, cells 14–54 μm diam. Hairs of the ectal surface hypha-like, hyaline, often branched, septate, up to 460 μm long and 6.5–8 μm wide, thin-walled (0.2 μm). Inner medullary layer of textura intricata, composed of septate, inflated, 8–15 μm wide hyphae. Hypothecium composed of small, irregularly elongated cells. Paraphyses filiform, up to 3 μm wide, septate, with conspicuously curved, slightly enlarged (4 μm) and often dentate apex. Asci 190–220 X 10.8–12.2 μm, cylindrical, 8-spored, but sometimes only 2–6 ascospores developed in the ascus. Ascospores ellipsoid or of an irregular shape, containing two guttules at maturity, densely irregularly and incompletely reticulate, 14–19.5 X 6.7–8.3–9 μm, but in case only 2–6 ascospores mature up to 20 X 10 μm. The reticulum is formed of thin (0.15–0.2 μm) and often extremely densely arranged ribs, often mixed with small, isolated verrucae, in optical section the ribs and warts 0.1–0.45 μm high, usually elongated on the ascospore poles (up to 0.5 μm). (Oil immers. 1600X + CB, and SEM.)

Habitat: Czechoslovakia, boreal Slovakia: Mt. Vysoké Tatry, between Východná and Važec (850 m), at the margin of a coniferous wood, 3.ix.1972, leg. Ing. Jan Kuthan. Holotype: BRA (n° 01206).

Other specimens examined: Bohemia: Roblín, in a spruce forest, 2.vii.1963, leg. E. Wichanský (PRM 624100); Srbsko district Beroun, in a mixed wood on soil, 10.vii.1949, leg. Dr. Mirko Svrček (PRM 608088); Karlštejn, in a wood, 23.viii.1959, leg. E. Wichanský (PRM 617795); Příbram, in a spruce forest, 11.vii.1948, leg. Pojc (PRM 608090).

Sowerbyella densireticulata often has very small, subsessile apothecia. It clearly differs from S. **radiculata** and other related species by much larger ascospores and much finer and different ascospore ornamentation, as shown also by SEM. S. **fagicola** has similar ascospore size, but differs by the shape and color of apothecia and particularly by ascospore ornamentation. It appears that **S. densireticulata** is related not only to S. **radiculata** but also to S. **fagicola**, which in turn is related to S. **imperialis**. All seven accepted species of **Sowerbyella** are closely related, but have sufficient characters for specific delimitation.

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REVUE DES LIVRES

par

G.L. HENNEBERT
Book Review Editor, Croix du Sud 3, B-1348 Louvain-la-Neuve
Belgique.

THE PRESERVATION AND MAINTENANCE OF LIVING FUNGI, by D. SMITH and A.H.S. ONIONS, 52 p., 11 fig., 8°, paperback, 1983. Publ. Commonwealth Mycological Institute, Commonwealth Agricultural Bureaux, Central Sales, Farnham Royal, Slough, SL2 3BN England.

This booklet revises the methods of preservation of fungus cultures used at the C.M.I. Culture Collection, from the simple and cheap to the more sophisticated and expensive ones. For achieving a good preservation, an optimal growth of the cultures is required. The authors detail the optimal growth conditions of temperature, light, aeration and water supply for fungi. Preserving the cultures in continuous growth is done by regular, sometimes frequent, transfer or storage under mineral oil or under water, during which the growth is most often reduced. Cultures are also successfully preserved in discontinued growth by storage of germinated spores, dried on sterilized soil as a support. Drying at cool temperation induces spore dormancy and allows the preservation of the viability. That is performed by drying spores on cooled silicagel and storage in dry condition, by freeze-drying or lyophilisation or by freezing and storage under liquid nitrogen at -196°C. These latter methods require a set of special and expensive equipments but allow long term preservation. The number of mutation caused by preservation conditions in the fungal strains depends on the method used. By using all methods, mutations have been recorded, depending on the type of microorganism or, in the same group of microorganism, on the genus or the species. The authors emphasize the records of longevity observed in the preservation of fungus genera by each of the methods and propose an evaluation. The booklet is completed with detailed formula of culture media, an interesting list of recommended conditions of culture and preservation for a range of fungi, the use of UV light to induce sporulation, the control of mites and a bibliography.

CRITICAL PROBLEMS OF CULTURE COLLECTIONS, by Lekh R. BATRA and T. IIJIMA, ed., 72 p., 8°, 1984. Institute for Fermentation, 17-85 Juso-honmachi 2-chome, Jodoa gawa-ku, Osaka 532, Japan.

This publication relates a symposium held at the Third International Congress, Tokyo, on September 3 1983 and is issued in commemoration of the 40th anniversary of the Institute for Fermentation, Osaka. This symposium tells about the problems of the acquisition and the maintenance of cultures on a world-wide basis, particularly from unexplored regions, the preservation of the original natural specimen, the documentation on the nomenclature, the source, the history, the host and the proprieties and the need for a continued research in cultivation and preservation equipments and methods. As cultures may be vital tools in biotechnology, standards in testing or subjects of patents, special care under national or international law must be taken. Collecting sufficient funding to maintain and develop what may too easily ressemble a museum is another vital problem that worries so many curators of Collections. Authorities like E.G. Simmons, M.A. Schipper, S.C. Jong, A.H.S. Onions, C. Kurtzman and R.E. Stevensen have, with the editors, expressed their conviction that all Culture Collections need consideration.

MAINTENANCE OF MICROORGANISMS, a manual of Laboratory methods, by Barbara E. KIRSOP and J.J.S. SNELL, x + 208 p., ill., 8°, cloth bound, 1984. Academic Press Inc., 24-28 Oval Road, London NW1 7DX, U.K. Price: $ 20.-

With the collaboration of 15 specialists in the maintenance of Culture Collection in UK, the editors succeeded in producing a very useful compilation of all methods in use in the maintenance of strains of microorganisms, bacteria, fungi, algae and protozoa, as well as plant and animal cells. As indicated by the subtitle of the book, its aim is to serve in the laboratory. Eleven of the fourtheen chapters deal with the maintenance of a particular group of microorganisms or cells, and provide all precise technical data allowing the users to apply the methods correctly. But they also provide an evaluation of each of the described methods, on the base of often long term essays. A general chapter tells the goals that the user can reach in choosing a particular method of preservation. In fungi, four main methods are described with their variations: subculturing on agar, on cooled agar, on agar under oil or on agar blocks in water, drying on anhydrous silicagel or in soil, freeze-drying, and freezing either on agar slopes at low temperature or in a cryopreservative at very low temperature in liquid nitrogen. The ways of storage and retrieval of the strains are fully explained. The book, as it also refers to the literature on the subject, will enhance further investigations and research. It also provides useful addresses of equipment suppliers.

OUTLINE OF THE ASCOMYCETES - 1984, by Ove ERYKSSON, 72 p., 16x24 cm, paperback, 1984. Ove Eryksson ed. Institute of Ecological Botany, University of Umea, S-901 87 Umea, Sweden.

The 220 Ascomycetes families, accepted from 255, are disposed in 44 orders and a group of families of uncertain affinities. 6.035 have been refered to families or to groups of genera of uncertain affinities. No comments on the present outline, the mention of changes from the previous proposed outlines excepted, are given. Intendedly the author publishes the present outline as a preliminary proposal about which he whishes to receive corrections, additions and any suggested taxonomic changes from the readers. A definite revised and commented outline with keys is intended for 1986.

A MANUAL OF MUSHROOM GROWING, by Dr. Harnek Singh GARCHA, 72 p., 29 fig., 14x21 cm, paperback, 1984. Punjab Agricultural University, Communication Centre, Ludhiana, India.

This booklet is of interest not only for the description of the technics of mushroom cultivation in use but also for the scope on the economic importance, the status and the development of mushroom cultivation in the Punjab, India. Three main kinds of mushroom are cultivated: *Agaricus bisporus, Volvariella volvacea* and *V. diplasia* and *Pleurotus sajorcaju, P. ostreatus (florida)* and *P. flabellatus*.

I FUNGHI NELLA PRATICA ISPETTIVA (The Mushrooms practical Inspection), by Nando TOGNI and Filiberto FIANDRI and coll., 176 p. ill., 14 col. pl., 16x22 cm, paperback, 1984. Publ. Camera di Commercio, Servizio Igiene Publica U.S.L.N. 16, Via Canaletto 15, 41100 Modena, Italy.

This book is published by the Urban Survey Commission for the Hygien and Food Control and the Gruppo Naturalistico Modenese. It fulfils a gap in the current literature on practical mycology and food inspection, as it provides the necessary guidance in the inspection and identification of the main edible and non edible mushrooms as well in the dried or canned conditions as in the fresh ones. The necessary characters of the genera of Basidiomycetes are outlined in a first part. The appropriate technics of examination of fresh, dried and canned mushrooms are detailed in full text and in diagrammatic tables. The study of the russulas, boletes and truffels is emphasized. A conspectus of the Italian regulations on collecting and saling mushrooms ends this very useful book.

THE LICHEN-FORMING FUNGI, par D.L. HAWKSWORTH et D.J. HILL, Coll. Tertiary Level Biology, viii+158 p., ill., 1984. The Blackie Publishing Group, Wester Cleddens Road, Bishop Briggs, Glascow G64 2NZ, UK. Price: £ 7.95 paperback; £ 16.95 hardcover.

Le regard des auteurs, dans cet exposé succint de lichénologie pour le niveau sous-gradué, est marqué par le titre lui-même, les champignons lichéniques. C'est quelque peu nouveau et intéressant à la fois. Les lichens sont des manifestations symbiotiques et ne sont pas un groupe du système botanique. Ce sont essentiellement les champignons qui les caractérisent et les différencient. Cela apparaît bien dans les premiers chapitres sur la formation du thalle et dans la reproduction. En effet, à l'examen plus précis des caractères fongiques du symbionte, une classification basée sur l'ontogénie des organes de reproduction fongique permet de classer adéquatement les champignons lichéniques dans la classification des champignons. Ainsi, depuis peu, une attention nouvelle est donnée aux "deuterolichens" à reproduction conidienne. Par contre, la physiologie, le métabolisme, l'écologie, la sociologie et la biogéographie, qui couvrent les chapitres suivants, sont des phénomènes propres de la symbiose dans lesquels la part de chacun des symbiontes n'a pas encore été faite. Les auteurs insistent pour terminer sur les aspects d'application de la lichénologie: la production de métabolites secondaires et la gestion de l'environnement.

PLANT PATHOLOGIST'S POCKETBOOK, par A. JOHNSTON et C. BOOTH, deuxième édition, Publ. Commonwealth Mycological Institute, viii+ 439 p., 11x18 cm, dos papier, 1983. Commonwealth Agricultural Bureaux, Farnham Royal, Slough SL2 3BN, England.

Ce petit livre de poche publié dans une forme compacte, en petits caractères sur fin papier, résume l'essentiel de la phytopathologie, science à laquelle le praticien a besoin de se référer dans son travail journalier. Le livre passe donc en revue les maladies d'origine fongique, bactérienne, virale, mycoplasmique, les désordres par accident climatique, pollution ou carence, comme les dégâts aux plantes par nématodes, insectes, arthropodes, mauvaises herbes et végétaux parasites. Il envisage alors les moyens de lutte, l'avertissement, l'évaluation des pertes, les quarantaines, l'incidence des champignons sur l'homme. A cela s'ajoute une partie plus appropriée à l'analyse, comprenant les techniques microbiologiques d'examen, le contrôle des semences, la récolte d'échantillons, les techniques d'identification, les moyens de stérilisation et de culture, l'observation et les protocoles.
Enfin, une liste bibliographique, par matière, de 20 pages, complète ce livre. Il faut encore noter que ce livre de poche traite aussi bien des maladies des plantes tropicales que des plantes tempérées et se révèle d'un usage universel.

USTILAGINALES OF THE BRITISH ISLES, by J. Elizabeth M. MORDUE and G.C. AINSWORTH, C.M.I. Mycological Papers n° 154, 96 p., 172 figs., paperback, 1984. Commonwealth Agricultural Bureaux, Farnham Royal, Slough SL2 3BN, England. Price: £ 14.00.-

This issue of the Mycological Papers is an updating of the 1950's List of Ustilaginales recorded for the British Isles, with 16 additions in the genera *Anthracoidea, Entorrhiza, Urocystis* and *Ustilago*. The taxonomic changes are a few. *Cintractia caricis* and *C. subinclusa* are reclassified in *Anthracoidea*. *Tuburcinia* is united to *Urocystis*. *Tilletia triciti* excepted, other smuts on cereals are classified in *Ustilago*. The included taxa have been redescribed on base of British material. Special care has been taken to scrutinize the validity and correctness of the names. A few nomenclatural changes have been required in agreement to newly accepted 1753 starting point. A large number of photographs illustrate that revision.

METHODS IN PLANT PATHOLOGY, by R.T. BURCHILL ed., C.M.I. Phytopathological Papers n°26, 43 p., 25x15 cm, 1981. Commonwealth Agricultural Bureaux, Farnham Royal, Slough SL2 3BN, England.

A first contribution by T.F. Preece traces the history of the technics used in experimented plant pathology and stresses the need for more teaching of practical and technical skills. J.M. Waller discusses the ways of isolating, culturing and inoculating fungal plant pathogens. S.T. Buczacki is concerned with soil and root plant pathogens, their direct observation *in situ* and after extraction by physical ways. The peculiarity of those organisms is to produce resting structures, as well as motile spores and to be subjected in natural conditions to the whole soil microflora. Bacterial and viral plant pathogens, the design and the analysis of field trials and fungicide trials are also extensively dealed with. An unexpected large literature is cited in each of the papers.

THE STABILITY OF INDUSTRIAL ORGANISMS, par Barbara E. KIRSOP, ed., Publ. Commonwealth Mycological Institute, 57 p., 25x17 cm, dos papier, 1980. Commonwealth Agricultural Bureaux, Farnham Royal, Slough SL2 3BN, UK.

Cette brochure est le compte rendu de sept exposés présentés au cours d'un Symposium tenu à l' University of Newcastle-upon-Tyne , le 20 juillet 1979, sous l'égide de la Fédération Britannique des Collections de Cultures. En effet, la stabilité génétique, physiologique, métabolique et morphologique des souches est une des préoccupations des responsables de Collections comme des utilisateurs industriels et scientifiques. Le problème est complexe: les procédures de conservation varient en complexité et en coût, la réponse des microorganismes à ces procédures est variable et entraîne des longévités différentes. Parfois les exigences des utilisateurs sont à court terme et pour de faibles quantités, en d'autres cas, c'est l'inverse. Mais toujours il convient de retrouver l'organisme avec toutes ses propriétés. La conservation de souches stables dans l'industrie qui les utilise est difficilement garantie, si ce n'est par la mise en oeuvre de moyens appropriés. Cependant, l'instabilité génétique des cultures résulte de causes et de circonstances petit à petit mieux étudiées. Les variations, sans doute résultant de mutations, sont fréquentes dans la production de vaccins et d'antibiotiques, dans la fermentation de la bière ou dans la fabrication de produits laitiers fermentés, à partir de cultures mixtes ou encore au cours de cultures continues. Les procédures de cultures et de stockage en sont responsables et font l'objet de recherches avancées.

INTERNATIONAL DIRECTORY OF MYCORRHIZASTS - ANNUAIRE INTERNATIONAL DES MYCORHIZOLOGUES, by Valentin FURLAN and J. André FORTIN, 2nd edition, x+162 p., 23x17 cm, paperback, 1984. Ed. Dr. V. Furlan, Station de Recherches, 2560 Boulevard Hochelaga, Sainte-Foy, Québec, G1V 2J3 Canada. Price: US $ 10.00.-

Contact between scientists of all nations is an important factor of scientific development. Research on mycorrhizae started one century ago. 599 "mycorrhizasts" are lised up to now in the second edition of that Directory. They come from 60 countries. They are arranged in four index, alphabetically by country with full address in the first index, according to their research field and type of mycorrhizae as principal activity in the second index and as minor activity in the third index, and by names alphabetically with cross-reference to address and fields in the last one. Such a Directory is a welcome initiative that can enhance exchange, collaboration and progress. Invitation is addressed to each of us who is working on the field to let know his(her) identity.

MICROFUNGI PARASITIC ON VASCULAR PLANTS IN WATERTON LAKES NATIONAL, ALBERTA, AND ENVIRONS, par J.A. PARMELEE, Agriculture Canada Technical Bulletin 1984-11, 32 p., 7 figs., 4°, dos papier, 1984. Biosystematics Research Institute, Research Branch, Agriculture Canada, CEF, Ottawa, Ontario K1A 0C6, Canada (in English or in French).

Ce travail de J.A. Parmelee, un spécialiste des rouilles du Canada, présente la liste annotée des 117 espèces de parasites fongiques récoltées au Parc National des Lacs Waterton, Alberta. Plus de la moitié représente

les rouilles, l'autre moitié appartient aux Erysiphales, Pyrénomycètes, Discomycètes, Hyphomycètes, Coelomycètes, avec une Péronosporale et une Taphrinale.Un index des hôtes et de leurs parasites répertorie 113 genres botaniques d'hôtes.

COFFEE RUST IN THE AMERICAS, by Robert H. FULTON, ed., A.P.S. Symposium Book n°2, viii+120 p., 22x14 cm, paperback, 1984. The American Phytopathological Society, St Paul, Minnesota, U.S.A. Price: $ 14.00.- (members); $ 18.00.- (non members).

Coffee specialists from eight countries met at the 1982 APS Meeting in Salt Lake City and emphasized the economic impact of coffee rust *Hemileia vastatrix* on the development of Central and Latin America. More than 32 races of the coffee leaf rust are known and their recent spreading through the Americas amplifies dangerously. Chemical control as applied in Africa on the base of good epidemiological knowledge is of course possible. But more research must develop in the selection of rust-resistant host. A Central American Coffee Rust Project, founded on USAID/ROCAP donation, aims to study the epidemiology of the rust and of its vector, the coffee bean borer, to develop new rust-resistant varieties, to develop adapted cultural methods,to select the appropriate pesticides and to enhance communication and collaboration.

SOYBEAN RUST, by Kenneth R. BROMFIELD, A.P.S. Monograph n° 11, vi+65 p., ill. figs., 4°, paperback, 1984. The American Phytopathological Society, 3340 Pilot Knob Road, St Paul, Minnesota 55121, U.S.A. Price: US $ 8.00.- (member); $ 10.50.- (non-members).

Diseases of such a world-spread vital crop like soybean need particular attention. This monograph on *Phakopsora pachyrhizi*, the causal agent of the soybean rust, fulfils an urgent need, as so little information exists about it. Research about it started 14 years ago. The results of a cooperation of USA, Australia and Taiwan are presented here. The disease is largely distributed, mainly in Australia, China and South East Asia and the Americas, and has entered Africa. Taxonomy and morphology of the pathogen is carefully illustrated. The response of the pathogen to the environmental factors at germination, appressorial development, penetration, colonization and sporulation up to the telial state is fully detailed. Pathogenicity, host range, physiological races have been demonstrated. Different approaches are proposed to control the disease: the chemical and the biological approaches are not applicable at this time. Genetic breeding of resistant host cultivars is conversely in application with promising results in most of the concerned countries.

LOS HONGOS EN LA COCINA MEXICANA, par Gastón GUZMÁN, 80 p., col. plates, 21x14 cm, dos papier, 1984. Publ. Sociedad Mexicana de Micología, Apartado Postal 26-378, México 16, D.F.

S'adressant aux mycophages et aux autres, ce petit livre réunit 103 recettes culinaires à base de champignons, *Boletus edulis, Lentinus edodes, Cantharellus cibarius, C. floccosus, Clitocybe gibla , Pleurotus ostreatus, Agaricus campestris, Russula brevipes, Lyophyllum decastes, Lactarius scrobiculatus, Morchella esculenta* et *Hyphomyces lactifluorum*. Vous y trouverez aussi une recette de crêpes à l'*Ustilago maydis* !

NORDIC NAMES OF PLANT DISEASES AND PATHOGENES, Bacteria and Fungi, by H.B. GJAERUM, J.P. SKOU, B. LEIJERSTAM, A. YLIMÄKI and S. ÓLAFSSON, 547 p., 22x15 cm, paperback, 1985. Det Kgl. Danske Landhusholdningsselkab, Rolighedsvej 26, 1958 København V, Denmark.

Initiated by Prof. N. Fabritius Buchwald, this work aims to present a multilingual list of the plant diseases and disorders from horticulture, agriculture and forestry within the Nordic countries. The list follows the Latin names of hosts and provides a numbered alphabetical list of the pathogenes (bacteria and fungi) after their Latin name, jointly with their common names in English, Fins, Denish, Norvegian and Swedish. A second register lists the pathogenes under the same number with Latin name, authors and synonyms. Alphabetical lists of the common names of pathogenes and hosts help the reader in his search. Although no reference to the literature is provided, the book is a contribution to mutual communication between Nordic plant pathologists.

LES TRICHOLOMES DE FRANCE ET D'EUROPE OCCIDENTALE, by Marcel BON, vi+324 p., 70 figs., 4 col. pl., 8°, cloth bound, 1984. Editions Lechevalier, 120 Boulevard Saint-Germain, F-75280 Paris 06.

Author of numerous papers in the BULLETIN DE LA SOCIETE MYCOLOGIQUE DE FRANCE, REVUE DE MYCOLOGIE and DOCUMENTS MYCOLOGIQUES edited by Dr. Gehu, M. Bon presents here not only a compilation of his notes but a well written monograph of the group of *Tricholoma*-like mushrooms, those of the subfamily *Tricholomatoideae*, tribe *Tricholomateae*. The author subdivides his work into a general part with a revision of the characters for description and identification, the ecology, the phylogeny and the edibility, and a descriptive part. The descriptive part deals with three genera: *Tricholoma* (Fr.) Staude, *Callistosporium* Singer and *Tricholomopsis* Pilat ex Singer. At first the author introduces to the taxonomy of the family *Tricholomataceae* that he subdivides in three subfamilies and 6 tribes. The genus *Tricholoma* is treated within 6 sections and 12 subsections and comprehends 110 accepted species, varieties or formae. All the descriptions are based on very careful observations of the macroscopical and microscopical characters, illustrated by a line drawing or, in 21 species, by beautiful coloured aquarelles. The habitat of the examined specimens is reported with details. Abundant comments on the literature, the iconography and the taxonomy of the species are printed in smaller figures and may cover more than two pages. The genera *Callistosporium* and *Tricholomopsis* with 4 and 6 species respectively are treated in the same excellent way. A key for identification and an index complete this appreciated contribution.

LA DESCRIPTION DES CHAMPIGNONS SUPERIEURS (Basidiomycètes charnus), by Marcel JOSSERAND, 2nd edit., 100 p., ill., 8°, cloth bound, 1983. Ed. Lechevalier, 120 Boulevard Saint-Germain, Paris.

This book is inspired by the scientific precision that the author whishes to enhance in the descriptive mycology, especially of the higher Basidiomycetes. Precision in both the observation and its expression by words is needed, if mycology is to be communicable. In the first half of his book, the author invites to consider the descriptive observation and

its technics. What is to be described, what character should be observed and how should it be so, and in what terms. Each character of each part of the fruitbody and the mycelium is thus defined, approached through an appropriate technic and expressed by words (attributes). The distinction between the organ, the character and the attribute is indeed essential to the descriptive process. The macroscopic and microscopic characters, the organoleptical and chemical characters and the characteristics of the natural site are considered. To observe with precision is one step, to express with univocity is another one. Surely, drawings and photographs are excellent ways of univocal description. The author does not deny that but his aim is to plead for an univocal and precise descriptive language. In the second half of his book, a "vocabulaire raisonné" of any descriptive terms used in French mycology is proposed. Every term is defined and eventually illustrated. Any variant meanings are discussed and one of them is recommended and justified in order to reach univocity in the interpretation. Such a defined vocabulary will help the beginners. The specialist will also have use of an univocal language.the appropriate tool for more precise description of species. If in the past descriptions of fungus genera and species had been precise and univocal as we wish to have them today, the fungus nomenclature, the frequent modifications of which are bitterly criticized by the author, would have been more stable. Indeed, it is neither the foolishness of the legislator nor the 'fury for innovation' of the mycologist that the author should incriminate to be the cause of name changes, but the excusable looseness of the old original descriptions and the natural evolution of any knowledge towards more precision and objectiveness.

NUMERICAL TAXONOMY, par J. FELSENSTEIN ed., in NATO Advanced Sciences Institutes Series G:Ecological Sciences n° 1, x+644 p., ill., 8°, cartonné, 1984. Springer Verlag Berlin, Heidelberg, New York.

L'éditeur présentre les septante-deux contributions lues au Congrès du NATO Advanced Study Institute on Numerical Taxonomy, tenu du 4 au 16 juillet 1982 à Bad Windsheim, Allemagne. Les contributions ont été regroupées en 9 différents domaines. Le premier introduira le lecteur à la philosophie de la classification des êtres vivants, une approche à une classification naturelle ou utilitaire et à l'usage de la méthode numérique phénétique basée sur la similitude ou cladistique basée sur une phylogénie. Le second recherche, par comparaison des méthodes phénétique et cladistique, l'évaluation de la congruence comme exprimant la stabilité de la classification. Là se trouve la voie d'une comparaison de diverses classifications. Le domaine suivant traite des voies et moyens de reconstruire, à partir d'une classification, le développement de l'évolution. Plus loin, c'est la variation morphologique qui pose des problèmes au taxonomiste. Elle doit être traitée quantitativement et être discontinue ou continue. Une autre variation de caractère difficile à traiter est celle liée à la distribution géographique. La correspondance entre la proximité géographique et la similitude morphologique peut être démontrée et aider à la recherche phylogénétique. Les mêmes démarches sont tentées à partir des caractères biochimiques des taxa. La taxonomique numérique d'un certain nombre de groupes d'êtres vivants et en particulier du genre *Chaetomium* par H.K. Seth illustre enfin la théorie. Ce livre n'est pas un ouvrage d'initiation. Il s'adresse au spécialiste. Il serait très utile que d'autres ouvrages d'initiation sur le sujet soient publiés par les spécialistes.

BIODETERIORATION 5, par T.A. OXLEY et Sheila BARRY, ed., xxiii+
750 p., ill., 8°, relié toilé, 1983. John Wiley & Sons, Baffins
Lane, Chichester, Sussex PO19 1UD, United Kingdom.

La biodétérioration est cette biodégradation indésirable causée par des êtres vivants, les microorganismes en particulier, à des matériaux ou des matières d'importance économique. A l'inverse, la biodégradation est ce phénomène de conversion catabolique permettant de transformer certaines matières de déchets en substances de plus hautes valeurs. Biodétérioration et biodégradation obéissent aux mêmes processus profonds. Ce livre est le compte rendu du 5ème Symposium international de Biodétérioration et regroupe les 75 communications en 10 sections. Les principales traitent de la biodétérioration du bois et produits dérivés, des déchets solides et effluents, des produits pétroliers, des objets d'art et de bibliothèque, des céréales et autres produits agricoles et des matériaux en milieu marin. La bioconversion de polymères est un nouveau sujet. Le contrôle de la biodétérioration par biocides, biostatiques et préservatifs reste un sujet d'actualité. Près de la moitié des communications traite de l'activité des champignons destructeurs du bois, de cuir, de peintures, de plastiques, de pétrole, de cellulose. Comme les quatre volumes précédents, ce volume reflète de la qualité de la recherche dans ce domaine d'application de la mycologie. Il est certain que nous ne saurions trop encourager le développement de ce domaine de recherche, car il est tout en faveur de la promotion de la mycologie fondamentale.

MYCOLOGIE GENERALE ET STRUCTURALE, by Marcel LOCQUIN, xxviii+551 p.,
53 figs., 8°, cloth bound, 1984. Masson Ed., 120 Boulevard Saint-
Germain, 75280 Paris 06. Price: FF 480.-

This voluminous book is in two parts. One of "General Mycology" deals with a chapter on taxonomical methods. Another chapter deals with the author's classification of Mycota, a last one with the geological evolution of fungi. A second part, called "Structural Mycology", is composed of successive, unordered topics as fungal ecology, genic recombination, fungal biomass, odors, biochemistry, metabolites, allergogens, hallucinogens, fungal differenciation, spore classification, is intermixed with several topics on mathematical, experimental, microscopical, genetical or biochemical technics. Reading the book, I felt perplexity about reviewing it, as it corresponds so truly to the author's position taken in the "Avant Propos" by noting Descartes:"Pour atteindre la vérité, il faut...se défaire de toutes les opinions...reçues et reconstruire...les systèmes de ses connaissances." His work appears thus original and so often in discordance from classical knowledge. Certainly such a position is of interest and should draw the attention. But the author does not help the reader. Although he complains, in the "Avant Propos", of the hermetic esoteric language of the specialist, he uses a similar language, crammed with new, not defined terms. As an example, the Deuteromycetes, called Adelomycetes, are said to be "des mutants adelphiques" (p. 6) and further, fungal thalli "adelphisés et adélisés par mutations adelphiques oncogènes"(p.64)without any definition of each of these terms. The author also recommends the so called Russo's rule that fact and interpretation is to be distinguished, but it is very difficult to find out what of the contents is factual, hypothetical and interpretative. Furthermore, either authors' references are not given in

the text, or, when given, bibliographical references are often missing in the appropriate list.
The author recapitulates his own classification of the Mycota over 152 pages, up to the families. The Mycota are said to belong to a (new) regnum, the *Chitinibionts,* and are subdivided in 6 subdivisions: the Arthromycotina (including the Actinomycetes together with the Acrasiomycetes, Plasmodiophoromycetes and Oomycetes), the Myxomycotina, the Zoomycotina (fossils), the Zygomycotina, the Ballistomycotina (syn. Basidiomycetes; including the subclasses of the Basidiomycetes as classes, beside the Trichomycetes and the Ballistoblastomycetes), the Uteromycotina (syn. Ascomycetes, including nine classes of Ascomycetes, beside the Spermophthoromycetes and the Endomycetes) and the Adelomycotina subdivided in 8 classes, 57 orders and 189 families. The whole classification is based on a new nomenclature based mainly on 659 new names at the rank of family or above it, attributed to Locquin 1981 but said to be published in 1983. Seven pages of names of families and of higher rank are given as *nomina excludenda.*
Beside that classification, a botanical-like new nomenclature is established for the classification of the spore types. I wonder what is the benefit of using Latin taxonomic names for the description of spore form.
However, the reader may have interest in reading the chapters of the book. It contains indeed a batch of information on the ecology of the fungi, the fungal biochemistry, the spore morphology and on numerous technics in the study of fungi.
It introduces to numerical taxonomy and mathematical interpretation of the morphology. It also provides interesting data like lists of terms of odors and spore forms. Although some mistakes and blanks remain in the text, the edition of this book is of a high standard.

COLECCION ESPANOLA DE CULTIVOS TIPO. Catalogo de Cepas, 2nd edicion, by Federico URUBURU FERNANDEZ, 200 p., 20x14 cm, paperback, 1985. Sociedad Espanola de Microbiologia, Universidad de Valencia, Facultad de Ciencias Biologicas, Dept. de Microbiologia, Valencia.

The Culture Collection of Microorganisms of Spain has been created by Prof. J.R. Villanneva in 1960 and is directed by Prof. F. Uruburu Fernandez. It is a member of the World Federation of Culture Collection since 1977. It maintains cultures of bacteria and fungi.

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NOTICE

32nd ANNUAL CHARLES HORTON PECK MYCOLOGICAL FORAY

The Peck Foray this year will be held September 26-29th, 1985, in the Arnot Teaching and Research Forest of Cornell University, located in Van Etten, New York.

Housing will be available in cabins, and there are also nearby campgrounds and motels. Meals will be catered for those who reserve them. Microscopes and some books for identification will be provided, but participants are requested to bring their own driers.

Reservation forms (including maps, etc.) will be sent to those who request them by August 20th, by writing to:

R. P. Korf, Peck Foray Coordinator
Plant Pathology
Cornell University
Ithaca, NY 14853

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319,	line	27	for *C.* read *Chaetopsina*
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364,	line	31	for **E.** read **Endothia**
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CO-EDITORS OF MYCOTAXON

G. L. HENNEBERT
FRENCH LANGUAGE EDITOR
& BOOK REVIEW EDITOR

UCL, Place Croix du Sud 3
B-1348 Louvain-la-Neuve, Belgium

RICHARD P. KORF
ENGLISH LANGUAGE EDITOR
& MANAGING EDITOR

P.O. Box 264
Ithaca, NY 14851, USA

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